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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

HUXLEY MEMORIAL LECTURE on Biochemistry: Its Present Position and Outlook. By Prof. F. GOWLAND HOPKINS, M.B., D.Sc., F.R.C.P., F.R.S. 1247

A LECTURE on the Sensibility of the Skin in Relation to Neurological Theory. By WILFRED TROTTER, M.S., F.R.C.S. 1252

ORIGINAL ARTICLES.

Spinal Analgesia. By B. HOLROYD SLATER, M.B., F.R.C.S. 1256

Studies in the Male Breast. By HAMILTON BAILEY, F.R.C.S.—(*Illustrated*) 1258

Encephalitis Lethargica with Diplopia as an Early Sign. By C. W. Yow, M.B., B.Ch.—(*Illustrated*) 1260

The Intravenous Injection of Antitoxin in Diphtheria. By DONALD MACINTYRE, M.D., D.P.H., and D. W. MCKAY, M.B., D.P.H... 1262

MEDICAL SOCIETIES.

London Dermatological Society: Occupational Dermatoses 1264

Royal Academy of Medicine in Ireland: Epidemic Encephalitis with Painful Myoclonus 1265

Scottish Society of Anæsthetists: Anæsthesia: its Present Position 1267

Aberdeen Medico-Chirurgical Society.... 1269

REVIEWS AND NOTICES OF BOOKS.

Goitre. By Prof. F. de Quervain. Translated from the French by J. Snowman, M.D., M.R.C.P. 1270

Surgical Pathology. By Prof. Joseph McFarland, M.D., Sc.D. 1270

Die Röntgenbehandlung des Uteruskarzinoms. By Dr. Hermann Wintz 1271

Röntgentherapie, Oberflächen- und Tiefenbestrahlung. By Dr. H. E. Schmidt. Rewritten and enlarged by Dr. A. Hessman 1271

Infection, Immunity, and Biologic Therapy. By Prof. John A. Kolmer, M.D. 1271

The Sexual Life of Man. By Dr. Placzek. Translation revised by Dr. W. C. Rivers 1272

Sexuological Essays. By Dr. Rivers 1272

Medical and Veterinary Entomology. By Prof. W. B. Herms 1272

Love in Children and its Aberrations. By Oskar Pfister 1273

Quarterly Journal of Microscopical Science.. 1273

THE CONDUCT OF MEDICAL PRACTICE.

XVII.—Equal Pay for Equal Work. By Lady FLORENCE E. BARRETT, M.D. 1273

NEW INVENTIONS.

Ophthalmoscope Attachment (W. O. C. Jarratt, M.R.C.S., and Leonard P. Lockhart, M.B., B.Ch.)—(*Illustrated*) ... 1274

A New Magazine for Michel's Clips (Bernard Ward, F.R.C.S.).—(*Illustrated*) 1274

LEADING ARTICLES.

HOSPITAL SUNDAY 1275

NEW WORK ON THE ÆTIOLOGY OF SCARLET FEVER 1275

THE DIAGNOSIS OF TUBERCULOSIS IN PENSIONERS 1276

NON-POTABLE SPIRIT.... 1277

ANNOTATIONS.

Local Anæsthesia 1277

Acute Gonorrhœa in Women 1277

Spring Tiredness as a Vitamin-Deficiency.—(*Illustrated*) 1278

Medical Examination of Factory Entrants 1278

The Entry-Aperture of the Ovum 1279

The Therapeutic Value of Cinchonine 1279

Sex-Incidence of Causes of Death 1279

The Food-Poisoning Incident at Wembley..... 1280

Smoke Abatement at Nottingham 1280

New Mental Hospital Accommodation 1280

MODERN TECHNIQUE IN TREATMENT.

LXXVI.—The Treatment of Acute Gonorrhœa in the Female. By J. JOHNSTON ABRAHAM, F.R.C.S. 1281

PUBLIC HEALTH SERVICES.

School Medical Service: Sheffield.—Bootle.—Shrewsbury.—Bedford.—Hartlepool.—Gillingham.—Bournemouth .. 1282

Infectious Diseases in England and Wales During the Week ended June 7th, 1924 1283

SPECIAL ARTICLES.

Venereal Disease in Belgium 1284

Vienna: Feeding of Unconscious Persons .. 1285

Ireland: The Local Government Bill.—Inquiry into the Health Services of Ireland.... 1286

Report of the Joint Board of Research for Mental Disease 1286

Voluntary Hospitals Commission 1293

CORRESPONDENCE.

The Simmins Appeal Fund (Sir W. Hale-White and Drs. H. C. Semon and David Nabarro)..... 1287

Lead and Cancer (Prof. W. Blair Bell) 1287

Encephalitis Lethargica and Nasal Douches (Sir StClair Thomson) 1287

"Induction" or "Cause" of Cancer (Sir G. Lenthal Cheatle, Dr. H. M. Woodcock) 1288

"Constructive Conscious Control of the Individual" (Mr. F. Matthias Alexander) 1288

Memorial to the late Prof. Peter Thompson (Prof. James C. Brash, and Drs. Leonard G. Parsons and Hilda N. Shufflebotham) 1288

The Psychology of Sea-Sickness (Surg. Rear-Admiral C. Marsh Beadnell) 1289

Hyperglycæmia and Glycosuria in Acromegaly (Dr. P. J. Cammidge) 1289

The Value of Arc Light Baths (Drs. Albert Eidinow and Leonard Hill) 1290

OBITUARY.

Robert Bruce Ferguson, M.D., D.P.H. 1290

Richard Emmett, M.D., M.R.C.S. 1290

Clarence Alfred Joseph Wright, F.R.C.S., F.R.F.P.S. 1290

Edward Chichester, M.B. 1291

THE SERVICES.

Royal Naval Medical Service.—Royal Army Medical Corps.—Royal Air Force.—Indian Medical Service.—Deaths in the Services 1283

MEDICAL NEWS.

Royal College of Surgeons of England 1291

St. Thomas's Hospital Medical School 1282

British Orthopædic Association 1290

Cambridge Medical Graduates' Club 1291

Medico-Psychological Association 1291

Oxford Ophthalmological Congress 1291

Poor-law Medical Officers' Association 1292

Medical Golfing Society.. 1292

An Italian Medical Journey 1292

Public Health: The Bordeaux Congress.... 1292

Chartered Society of Massage and Medical Gymnastics 1292

Donations and Bequests.. 1292

Miller General Hospital for South London..... 1292

Research Defence Society 1292

Medical Society for the Study of Venereal Diseases 1293

Lancashire and Cheshire Society for the Permanent Care of the Feeble-Minded 1293

PARLIAMENTARY INTELLIGENCE.

House of Commons: Retrenchment in Indian Army Hospitals.—Sale of Patent Medicines.—A National School of Medicine. — R.A.M.C. Vacancies 1293

NOTES, COMMENTS, AND ABSTRACTS.

Colonial Health Reports: Federated Malay States.—Brunei.—Kenya Colony and Protectorate.—Kenya Medical Journal 1295

Inadequate Fees for Attendance on Military Patients 1296

A More Excellent Way .. 1296

Medical Diary 1294

Appointments 1294

Vacancies 1295

Births, Marriages, Deaths 1295

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MR. PRINCIPAL, LADIES, AND GENTLEMEN,—Let me first express my appreciation of the high honour done to me by the invitation to deliver this Huxley Memorial Lecture. The great English scientific worker and writer whom we commemorate did not in his own person contribute to the branch of knowledge which we are to consider, but it is a pleasure to know—as I do know—that in his later years he took much interest in it and believed in its importance.

The effective and continuous application of chemical methods and chemical thought to the problems presented by living plants and animals began somewhat suddenly when the nineteenth century was already well advanced. Such effective applications were first due to Justus v. Liebig, who as a biochemist seems to me to have had no predecessor in any sense that is real. Biochemistry as a body of knowledge owes, I think, almost nothing to ancient thought. The keen edge of the Greek intellect scarcely touched its particular problems as they now present themselves to us, for the sufficient reason that it possessed no data which would suggest that the problems, as we view them, even existed. The conscience of the historian of knowledge may, it is true, lead him to point to the iatro-chemists of the sixteenth century as predecessors of the modern biochemist; but if we do not let piety submerge our honesty, we must, I think, admit that the interest with which we read the outpourings of Paracelsus, and even the saner teachings of Van Helmont, is the kind of interest which attaches to the precocities of childhood. Such men, it is true, had intellectual predilections which may make them prototypes of the modern biochemical inquirer. Paracelsus, for instance, was, as Michael Foster said, "a chemist to the backbone," and he believed that through chemistry medicine was to become rationalised. But from his equipment facts were sadly absent and his teaching in consequence was sterile. Real appraisement, devoid of that sentimentality which often gives bias to history, will, I think, compel us to admit that there is no continuity between the thought of these so-called iatro-chemists and modern thought concerning biochemical phenomena.

THE BIRTH OF BIOCHEMISTRY.

It must perhaps be always characteristic of a typical borderland science that it should be born with apparent suddenness. There comes, as it were, a critical moment when, one parent science having sufficiently developed its technique, and the other parent science having formulated certain suitable problems, a union of the two becomes fertile. There must be a certain degree of maturity indeed in both parents before the new science can appear. In the case we are thinking of it is fair to say that biology waited for chemistry. The seventeenth and eighteenth centuries were barren in respect of what I have called effective application even of the available chemistry to the available biology, and the same may be said of the first third of the nineteenth. Doubtless there are names belonging to these years which the historian aiming at completeness would register as worthy of mention, and among them he would include the truly great names of John Mayow and Lavoisier. The work of these two laid once for all the solid foundations of knowledge concerning respiration. They might, indeed, be classed as predecessors of Liebig in the irrefragable proofs they brought forward that the methods of the laboratory yield rational results when applied to the animal body. The work of Lavoisier indeed links up directly, though upon limited lines, with that of the late nineteenth century, which finally showed that the body is a seat of manifold combustions and as such obeys the first law of thermodynamics. Lavoisier, however, did not give the impulse which led to the development of modern biochemistry. His thought with regard to living beings was confined to an aspect of affairs which, however important, was limited. Where the chemical properties of the living tissues were concerned his thought was undeveloped and detached. If we define biochemistry as the chemical study of the material basis of life in its dynamic relations, then it was, I think, Liebig who really initiated the study. From Liebig's time (say from 1840 onwards) progress in biochemistry has been real and quite continuous, though, strange to say, the fact is not always recognised even in scientific circles. In this country at least one often meets with the naïve belief that biochemistry as a line of inquiry worthy of respect is brand-new—a product of the present century. This is partly perhaps because it has only recently received its now accepted, but not very attractive, name as a distinct branch of science. There are other and more interesting reasons to which I must refer.

It is unfortunately the case that, until the beginning of the present century, English work did painfully little to advance the subject. There was less interest in it here than in any other country of importance, and this even in the case of professed physiologists and biologists, and quite certainly in the case of pure chemists. In Germany and in Scandinavia much work was being done even 50 years ago, and Slavonic names have always been prominent in the literature. The schools of Hoppe Seyler, Hofmeister, Nencki, and Hammersten were centres of highly productive activity. One of the earliest and most important of the special journals devoted to biochemistry—Hoppe Seyler's *Zeitschrift*—began its existence only two years after Liebeg's death, and its pages from the first illustrate the continuous growth of highly significant knowledge. It is noteworthy, however, that the votaries of the subject were long peculiarly isolated, and had but a small audience. It is not without interest to discover why this was so. Liebig's earliest days saw, of course, the beginning of modern organic chemistry as well as that of biochemistry; indeed, at first, it was interest in the latter which stimulated work at the former. But the very success of early efforts in the chemical laboratory proved to be somewhat fatal to biological interests. The classical case, for instance, of the synthesis of urea by Liebig's intimate friend and associate—Wöhler—while it of course had the profoundest significance for biochemistry, providing indeed its very charter as a rational pursuit, carried with it the germs of something exceedingly inhibitory. The excitement caused by the proof that organic compounds could be made in the laboratory, and the extraordinarily rapid growth of the art of synthesis led the chemist to make a fascinating world of his own composed of molecules made by himself and not by Nature.

Its Early Neglect.

Biochemistry thus was scarcely born when the work and thought of the qualified chemist became divorced from the living plant and animal, and it is only now that his interest in them is re-awakening. Had not this divorce existed, the history of biochemistry during the last 50 years might have been very different. That physiological and biological thought for a long period of years made relatively little use of accumulating biochemical data was doubtless also due in part to preoccupation. Great advances were being made on lines which made no call for chemical data, and there was for all biologists occupation in plenty without the need of overcoming that inertia which is felt when the language, methods,

and special conceptions of an accessory science must be acquired. But in the case of the biologist there was, I think, another reason for some lack of sympathy with biochemical effort. There was for a decade or two a pretty general feeling, which some minds still retain, that in biological phenomena chemical facts, though doubtless to be considered, are of superficial and largely technical import. Thus, while the borderland between chemists and biologists was being assiduously cultivated by at least a few devoted workers, for quite a long time very few indeed of their neighbours on either side looked over the border. Traffic across both borders is now setting in, and biochemistry is, I think, gaining sympathy and understanding from many chemists and biologists. I hope before long it may obtain them from all of them.

Sympathy and understanding from the lay public are, in a sense, not essential for scientific progress, but I am sure that most investigators would welcome, and be the better for, a general recognition of the fact that they are working for the public weal. It is certain that the lay public has not yet understood biochemistry, though the magnificent endowment that the subject has just received at Cambridge seems to show that men of affairs are open to conviction of its importance. But that the subject has hitherto had less public understanding than, perhaps, any other branch of applied chemistry is not surprising. The public relies on the lay press, and the press only notices in science what is sensational or of obvious practical import. Biochemistry has seldom, if ever, accomplished the former, and its practical applications have in the main been lost in what are for the laity the mysteries of medicine. But, to say the truth, biochemistry in the matter of public understanding only shares the fate of other biological science. Since it was startled by Darwin and by the pen of Huxley, but later forgot its alarms, the public has been apathetic where biology is concerned. The triumphs of pure chemistry and of modern physics are not unknown to it and represent its conceptions of the progress of science. Yet modern biology has, for those with ears to hear and eyes to see, triumphs scarcely less than those even of physics. I cannot yet claim this for biochemistry; but it can be claimed, say, for recent cytology, for certain aspects of genetics, and for that remarkable pursuit which has become known as experimental zoology. It is a pity that so many highly educated individuals know so little of the remarkably significant facts that have been won in these regions. But biological science has also great economic importance, and that fact the general public should at least be made to know. So great is that importance that I feel all should be grateful to your Principal, who has recently used his influence and his eloquence to urge it upon those who wish well to the Empire.

LIEBIG AND BRITISH APATHY TO SCIENTIFIC RESEARCH.

To convince the more practically minded of the English people of the importance of scientific knowledge is proverbially difficult. Face to face with this indubitable circumstance, Liebig developed a line of thought which seems to me so interesting that I will risk a little of my brief time to tell you of it. His pioneer studies in scientific agriculture (essentially biochemical in character) had produced much effect in Europe generally, but in England little or none. Here among our agricultural authorities there was nothing but disbelief or indifference. This fretted the mind of Liebig almost beyond his bearing. He set himself in characteristic German fashion to probe deeply for a cause, and he came to the extraordinary but, for him, quite clear conclusion that the apathy of the British farmer was due to the influence of Francis Bacon of Verulam! He traced parallels between what he read in the *Journal of the Royal Agricultural Society* and what he discovered in the works of Bacon, and gained the actual conviction that the spirit of that high priest of the inductive method stood between British understanding and German biochemical science.[1]

It is pathetic to realise that in spite of this laborious research into the causation of British apathy Liebig failed to combat it, and I fear that to this day his name is associated in this country with his extract of meat rather than with his truly great pioneer work in organic chemistry and biochemistry. I certainly do not share Liebig's strange obsession. I do not fear that the spirit of Francis Bacon will stand between me and my audience on the present occasion while I plead the cause of the subject. I have only to convince you that its methods yield significant data. My first intention, however, is to urge that biochemistry, being *par excellence* a borderland science, is for that very reason a fit meeting ground for many minds. I think the biologist should come to it because it endeavours at least to elucidate what must always be a fundamental question in biology, the physico-chemical nature of living material wherever found. I think that even the physicist, and, certainly, the pure chemist should, sometimes at any rate, cross the border—shall I say?—for refreshment and change of outlook. The chemist, at least, if he desire to survey the chemical field as a whole, must include in his survey the events which happen in the living cell. Nowhere else can he learn how complete the *organisation* of chemical events may be. The living cell, of course, is a field in which the influence of the colloid state, of surface activity, and of directive catalysis is displayed to the highest degree, but all of those related characteristics have, as their special and most significant result, the organisation of multifarious reactions into a unified, active, dynamic system. It is, as I have said, this organisation that the chemist meets nowhere else, and unless he bears in mind that the capacity of such an organisation does exist in the scheme of things his thoughts concerning chemical phenomena as a whole must be incomplete. The claims of biochemistry upon medical thought will form the theme of a later section of this address.

THE ATTRIBUTES OF BIOCHEMISTRY.

Before attempting to appraise the present outlook in the subject I would like to say a few words about some general attributes which attach to it as a pursuit. Let me first confess that although I have rightly claimed that for three-quarters of a century the progress has been continuous and real, and that what it offers to the inquiring mind is already of much importance, yet it represents what is still an immature body of knowledge. This is why I began by insisting upon the shortness of its history. Its votaries have till lately been few and their task has been heavy, and, to say the truth, because it is a borderland subject it calls not alone for the interest for which I have already begged, but for the practical help of workers with diverse qualifications. If it calls for recruits it must be able to promise careers, and this I find at the moment it is able to do.

Biochemistry has some special attributes as a calling. As a branch of applied chemistry it trenches more nearly upon philosophical prejudices than other branches. It comes indeed rather nearer to these than other branches of biology, for it seems to treat living matter with no more respect than we accord to dead matter. Can chemistry with the help of physics rightly describe systems which, at least in their higher developments, seem to become inevitably associated with the mysterious phenomena of consciousness? This reiterated question must still be asked. Not a few still think it presumptuous to pretend to such descriptions. They hold that they can at best be only equivalent to description of the play of *Hamlet* without the prince. I must, of course, not stop to put the case for vitalism or mechanism, and I have only strayed into this thorny but much-trodden path because I think this particular attribute of biochemistry does appreciably

[1] Liebig: Ueber Francis Bacon von Verulam und die Methode der Naturforschung, München, 1863.

affect the atmosphere in which its work is done. The thoughtful investigator is not always content to feel that utility alone justifies his efforts. He wants to conceive of some final if ideal goal. A young investigator may at moments have his doubts, but never when his research is making progress. Then, whether his tendencies are towards monism or dualism, or towards suspension of judgment on such matters, he is happy because he sees his work is real. Anyone who applies chemical and physical methods to the study of an organised system such as the living cell, and, perforce, deals with it piecemeal and from isolated aspects, must, of course, remember all the time that his data lose meaning if he does not in his thoughts relate the parts to the whole. The idea of "purpose" then creeps in, but it need not become a preoccupation. Abstract science has no such preoccupations, but it must be admitted that when a self-regulated system comes objectively before us it is difficult not to think that purpose controls its organisation. The purpose may be there, but, if so, it is surely not confined to biological systems. If a human mind familiar with the present scheme of things, and conceiving of no other, could have watched the evolution of atoms it would have seen purpose in the progressive reconstellations of electrons. Indeed, atomistic physics in its present endeavour to describe organised systems instead of dealing with abstract atoms comes nearer than before to the biological method of thought.[2] If a complete dynamic description of the living cell should ever become possible, the chemical facts, so far from being of superficial importance, must in any case form a highly essential part of that description. The exceptional nature of the materials with which it has finally to deal, and the fact that these materials are of real interest only while they still exhibit all that instability which represents life, introduce technical difficulties which constitute a second characteristic of biochemistry. Its earliest endeavours, of course, were mainly directed to isolating individual substances from the plant and animal with the intention of determining their constitution. To this endeavour there was early added (in the case of animal biochemistry) a study of what may be called the balance-sheet of the body, a comparison of income and outgo, and this permitted some, though very limited, conclusions as to the nature of the events in the body itself.

THE METHODS OF BIOCHEMISTRY.

It was indeed long the opinion of many that chemical studies could not attain to much more than this. How, it was asked, could information be obtained concerning events within living systems by methods which, at the moment of their application, must from their very nature upset the whole of the significant and essential relations? Yet it is a fact that biochemistry has so progressed that our studies of living tissues have become dynamic instead of static. By diverse methods, by taking advantage of one possibility here and another there; by realising the fact that individual reactions as such do not necessarily close when structure is destroyed; by learning how to arrest this or that process of change at its critical moment; by studying the activities of isolated organs while their life is artificially maintained; by noting the effect of the absence of this or that factor when it has been removed experimentally, or by disease or by inherited deficiencies; by noting what particular precursor can yield a given end-product; by using micro-methods of analysis so that they may be applied to the intact body without damage or hurt; by these and by a score of other (may I say) ingenuities in method, we are learning not only what chemical actions occur in living tissues, but the lines upon which reactions run, the stages through which they pass, the equilibria to which they attain. There is every reason to believe that without great difficulty we shall come to know the details of every one of the multifarious reactions which proceed, usually with great velocity, within a living cell. Far more remote is a grasp of their organisation which is the abiding characteristic of the cell. Personally, however, I do not believe that an ultimate understanding will call for knowledge of a category different from that which we are accumulating.

Apart from the instability of the systems which he is endeavouring to describe, the biochemist meets with another factor characteristic of his material: the importance, namely, of the infinitesimal. In living tissues a prepotent influence is exerted by substances present in concentrations which are minute. The necessity of adjustment to this circumstance, though by no means unknown to other branches of science, especially dominates the biochemical field and gives another special stamp to its study both on its theoretical and technical sides. Finally, biochemistry differs from other branches of applied chemistry in that it must at least occasionally employ living animals in its investigations. I might mention other characteristics, but I have said sufficient to remind you that the pursuit of biochemistry calls for a special equipment.

THE PRESENT OUTLOOK.

I will now pass on to some appraisement, necessarily brief and very imperfect, of its accomplishment and present outlook. I have already claimed that its data had reached real significance long before it attained in recent years to the status of a separate scientific discipline; but there is no doubt that its progress has accelerated of late to a degree which is striking. This is due in large part to efforts in its own proper sphere, but also, as would be inevitable in the case of any borderland science, to contemporary progress in the related sciences. Indeed, the factor of acceleration which would probably first occur to the mind of most is the coincident advance of physical chemistry. Biology, for instance, waited long for the data which colloidal chemistry is now supplying, and for such increased precision concerning factors which condition biochemical activity as may be illustrated by the arrival of the conception of hydrogen-ion concentration to replace the vaguer ideas of acidity, neutrality, and alkalinity. Such assistance has come, and is coming in increasing measure, from exponents of the more exact sciences, but the historian will note that these particular advances in physical chemistry of which I am speaking found their stimulus in biological needs and owed their initial success to biological workers. Biochemistry has, of course, also reacted to the progress of organic chemistry. Indeed, if one may make the point here—I have made it, too persistently perhaps, in other places—there is a tendency just now to ascribe to physico-chemical methods of study a too exclusive importance where the living cell is concerned. That the properties of colloids are of dominant importance goes without saying, but the multifarious organised dynamic activities in which the influence of molecular structure plays an unmistakable part are just as characteristic of life as the general behaviour of the colloidal apparatus in which these activities occur. It is true that the modern investigation of the behaviour of molecular structure at surfaces is breaking down somewhat the distinction implied in these remarks, but in any case the aid of the organic chemist in biochemical studies is needed as urgently as ever. It will be found, however, that much of the recently accelerated progress in biochemistry has been due to a development of its own technique. It was fortunate for the science that when some 15 years ago the need for new and especially for quantitative methods became urgent, a number of patient workers in America, in this country, and elsewhere set themselves to meet the demand with conspicuous success. This development continues, and of late has displayed itself especially in the multiplication of micro-methods of quantitative analysis, concerning the importance of which I will presently speak.

In illustration of the real significance of what has already been gained by biochemical study, I must be content to select a very small part of the available material. I will briefly discuss, almost in the form of a schedule rather than in that of a proper exposition,

[2] Compare Johan Hjort, The Unity of Science.

and perhaps without any logical sequence, certain aspects of the existing knowledge, each aspect being chosen to recall so far as possible a distinct line of endeavour with its results. I am inclined particularly to choose facts which emphasise the reality of the influence of molecular structure in the dynamic events of living matter, because I myself think that a realisation of this should form the very basis for biochemical thought. It seems to me that the influence of Ehrlich's "side-chain theory" has paradoxically made this reality unreal to some. That theory, though it served its turn, was itself an artificial and unreal application of structure considerations. It ultimately failed to satisfy, and many in rejecting it began to think in terms of adsorption, permeability changes, changes of dispersion and the like, and in these alone. This involves a standpoint quite as limited as that which the side-chain theory evoked. If I discuss facts which are familiar the circumstance will at least facilitate the brevity of treatment which is essential. I cannot deal with history.

Certain Aspects of Our Knowledge.

Up to the very end of the last century our knowledge of the chemistry of those primary constituents of living tissues, the proteins, was slight and unsatisfactory. Then came, somewhat suddenly, very remarkable and rapid progress in that knowledge. That the effect of this upon the biochemical outlook would be extensive everybody realised at the time; but its effect, difficult to appraise in a few words, has been even greater, I think, than was expected. The protein molecule, though exceedingly complex in the details of its structure, proved relatively simple in type. We know the units—the amino-acids—of which its complex pattern is built up and the constitution of each of them—some 20 in all. The significant circumstance, however, from the standpoint of biochemistry proper is that the digestive processes liberate the units of structure from the protein complex, so that it is with these, and with each of them individually, that the body deals. Since the molecular structure of each is known, what may be called the true organic chemistry of protein metabolism became a possible study, and it has progressed remarkably. When protein is consumed, 20 distinct substances enter the body each with its own special attributes. We possess suggestive knowledge concerning the fate in metabolism of each one of them. We know already, at least in outline, the stages of change through which each passes while suffering decompositions or syntheses in the body. Only those who compare with the present outlook the existing views concerning protein metabolism before this chemical knowledge came can realise how great has been the influence of that knowledge. Our recently won grasp of protein chemistry has furthermore made the biologist understand that underlying the morphological differentiation of species there is chemical differentiation, of which the primary seat is in the proteins of the blood and tissues. "The material determines the form."

Choosing another illustration of successful progress in the chemical study of tissue constituents, I may recall how detailed is the knowledge we possess of those specific substances, fundamental in biochemical importance, which characterise the nuclei of cells. The pure chemistry of the complex nucleic acids has become remarkably complete, and highly detailed is our knowledge of the successive stages in their metabolism.

THE INFLUENCE OF MOLECULAR STRUCTURE ON BIOCHEMICAL PHENOMENA.

In illustration of how most extensive information has been gained concerning the equipment of the living tissues as laboratories I might call attention to the researches which have dealt with the chemical fate of foreign substances when introduced into the body. The pharmacologist in studying organic drugs determines the influence of molecular structure as it affects the tissues. In doing so, however, he cannot refrain from ascertaining how, conversely, the tissues deal with the molecular structure of the drug. On these lines, carried outside the limits of pharmacology, a body of knowledge has grown up which is greatly significant to biochemistry. But it is technical and I must not dwell upon it. Suffice it to say that the body proves able to carry out efficiently, though under its own exceptional conditions, almost every process that is familiar to the organic chemist; and as much in the body as in the laboratory the precise fate of a substance is determined by its molecular structure.

I am much concerned to show how little any quality that is "biological" or "vital" in living systems submerges the influence of molecular structure—that is, the influence of frankly chemical properties—in biochemical phenomena. In further illustration of this I may turn to what is now the familiar subject of the internal secretions. The discovery of these, due to the pioneer labours of English physiologists, gave a new charter to biochemistry by adding to the biological reality of its data. Everyone who thinks at all of such matters will realise that in so highly differentiated a system as the animal body agencies must exist to coördinate the activities of each organ with those of all others, else the system could not work harmoniously. Until about 25 years ago such coördinating functions were ascribed solely to the nervous system. Now we know that underlying the influence of the nerves there is chemical coördination. Many, and probably all, organs and tissues of the body, in addition to exercising their local functions, pour into the blood-stream secretions which, carried round by the circulation, help to secure harmony and balance in the body as a whole. The normal working of each tissue would seem to depend upon such contributions from almost every other tissue. Profoundly significant, and a remarkable justification for the boldest application of chemical methods and chemical thought to the functions of the body, is the almost inevitable conclusion from our present knowledge that all their secretions act because each contains a definite specific substance which induces or controls some physiological event, or some essential aspect of a physiological event, as the result of its inherent chemical properties.

If the specific chemical properties of a substance, and these in the case of an organic compound represent the results of a particular molecular structure, determine the occurrence of change in a physiological system, it must be because within that system the properties of molecular structure are also somewhere displayed. It may be the structure of molecules in solution; it may be molecular structure displayed at surfaces. In any case, the chemical lever calls for a chemical fulcrum. In one case at least we have a perfect knowledge of the molecular structure—and it is a relatively simple structure—of a substance which appears in the body with profound effect. The case of adrenalin, which has occupied the attention of hundreds of observers, has become so familiar, and its physiological and pathological relations have so held the field, that its significance to my particular theme may be obscured. Here we have a substance produced, mainly, at least, by a pair of small organs and circulating at any moment in extremely small amount, which controls some of the most fundamental adjustments of the body. I clearly must not stop to dwell upon its functions. For the very few who are not familiar with them I may most briefly state that its availability in average amount secures among other adjustments the proper regulation of blood pressure and all that depends upon this. If its supply fails the animal is incapacitated, while an increase prepares it for strenuous endeavour by raising all the functions required by such endeavour to the right pitch of efficiency. From the standpoint which I am asking you to take, the essential thing is that these striking effects are due to the qualities of a relatively simple chemical substance of which the structure is known and which can be made artificially. The adrenalin molecule is one of a group of molecules

which exercise a prepotent influence in the scheme of things.

THE THYROID SECRETION AND INSULIN.

Exercising quite different functions, but of equal significance, are other definite chemical substances each elaborated by a special organ of the body. I will refer to two only. The iodine compound produced by the thyroid gland as the result of its innate characters controls in some remarkable way the rate of chemical change in the tissues. It has been isolated, though its constitution is not yet accurately known. Insulin produced in the pancreas is again assuredly a perfectly definite chemical agent, though awaiting isolation. The necessity of a supply of this last substance for the proper utilisation of sugar by the tissues is a circumstance with which everybody here will have recently become familiar. You will observe that what is significant for my particular theme is not the details of the physiological events, but the facts of the potency displayed by definite chemical substances in the normal control of such events. The effects of chemical structure are not submerged in the "biological" or "vital." Moreover, the importance of molecular structure is beginning to be seen in the catalytic agencies which are contained in the essential make-up of each individual cell. We know at least that one universal constituent of living cells, because of its molecular properties, determines the occurrence of change. Its molecule contains a Thiol group and the substance, itself being autoxidisable, determines, though present in very low concentration, the occurrence of other important oxidations. Its mere presence secures that a constituent part of the cell system shall display dynamic properties. In a real sense, I think, this substance "glutathione" may be looked upon as a simple model of an enzyme. Enzymes themselves are, of course, the chief catalytic agents in the cell, and concerning their molecular structure we as yet know nothing. Our attention so far has been mainly directed to their colloidal properties, but however great the importance of these, we shall, I feel sure, ultimately discover that some element of structure, some active group, is the essential determinant of each enzyme's activity. When an enzyme has been isolated and its precise nature determined, biochemistry will have taken a great step forward, because although a great deal of important information has accumulated as the result of studying the kinetics of reaction as controlled by these agents, the enzyme had perforce in every case been impure when introduced. The actual mechanism of enzyme action is yet unknown, and will be until we can investigate the nature of the catalyst itself. The endeavour to isolate enzymes is proceeding very vigorously just now, and is not without promise of an early success.

THE PHYSICAL BASIS OF LIFE.

The recognition of the existence of active specific catalysts within the cell and a belief in their manifold activity, together with some other advances, has modified in an important way views which were common in Huxley's time concerning the nature of what he called the physical basis of life—the material make-up of a living unit. We are ceasing to believe that the living unit is some sort of a giant molecule. The term protoplasm itself is, I think, recognised by most as representing an abstraction. The living unit is the cell, or if some simpler system, at any rate one of which the essence is that it is heterogeneous. There is no such thing as living matter in a specific sense. The criteria of life are displayed by systems in which catalysed reactions occur in a colloidal milieu. The special attribute of such systems from a chemical standpoint is that these reactions are organised, not that the molecules concerned are fundamentally different in kind from those the chemist meets elsewhere. If this kind of concept concerning the physical basis of life proves ultimately right, it is certainly more stimulating to chemical thought, and gives more justification for chemical methods of attack than the for ever elusive protoplasmic molecule. Certainly, intact living tissues would seem difficult enough to study by chemical means, but that solid information can be obtained about the events which occur in them, even without present technique, is well illustrated by the results of the studies of active muscle. It is, for instance, remarkable how satisfying is the present picture we possess, even though it be but a sketch, of the chemical events which are associated with the physiological events in muscular tissue.

As a last illustration of the significance of biochemical data I may adduce the growing knowledge concerning equilibria in the circulating blood. This constitutes already a chapter of exact science. It is based, indeed, upon the development of admirable methods. It covers the equilibrium changes between the blood and the alveolar air, between the blood and the tissues, and is concerned with the excretory functions of the kidney. It illustrates most remarkably the stabilising effect of perfect buffering in a fluid which constantly receives additions of acid or alkali without appreciable changes in the concentration of hydrogen ions. The properties of the hæmoglobin molecule as an oxygen carrier are so exceptional and remarkable, that I think no chemist's education can be complete unless he be fully familiar with them. I may point out further that the recent development of accurate micro-methods of analysis have enabled us to determine the amount of nearly all known constituents of the blood, organic and inorganic, on an amount of material which in each case can be got from a pricked finger, or at any rate upon two or three cubic centimetres. The effect of this or that factor upon the equilibrium between the blood and tissues can thus be determined in detail, and without inconvenience even to human subjects. A noteworthy body of knowledge is growing up on these lines which will influence both physiology and medicine.

My survey of the biochemical field has been so limited as to be almost trivial; but it is sure that nothing but the strictly limited could be attempted in a part of a single address. I have, to my regret, said nothing of the all-important phenomena displayed by the green plant, the very fundamentals of biochemistry. I have, again, not referred to the data gained from studies of the metabolism of micro-organisms. Yet in the case of bacterial chemistry much, if somewhat unorganised, knowledge has been gained, and, as you know, fermentation chemistry has of late made rapid strides. The lessons to be learned from the chemical behaviour of micro-organisms are indeed of profound importance to biochemistry as a whole. The science, like many others, has hitherto been studied too much in water-tight compartments. In one centre "biochemistry" means fermentation chemistry alone, in another medical chemistry alone. If now I am to turn to consider the future of the science I will start by saying that its future will be well served if it be taught, at least to a special group of students, as a whole. Metabolism—that is, the chemical dynamic of living things—to be understood must be thought of as a whole from its manifestations in a bacillus to its manifestations in man. So surveyed and thought about the subject becomes, as I have already claimed, a meeting place for many minds.

THE FUTURE OF BIOCHEMISTRY.

In a brief attempt to picture its future possibilities I cannot emulate the prophetic method of Mr. Wells, or the stimulating thought of my colleague Mr. Haldane. It would be, of course, easy enough to speculate, for example, upon a world in which biochemical synthesis replaced agriculture. Indeed, as soon as the constitution of three or four vitamins becomes known there is no reason, so far as we know, why we should not begin to set about the synthesis of a perfect dietary. Kindred speculations might easily occupy us, but something more sober may be more useful. Since, however, I have happened thus to touch upon the question of dietaries let me just state that, in my opinion, biochemical science will in the future yet have much more to say concerning the

details of ideal nutrition. I think surprisingly more! Such details may not at present interest the laity nor even the practising physician. The less thoughtful are content to remember that humanity has rubbed along very well in respect of its nutrition by the help of its instincts and experience alone. It was indeed a feeling similar to this, and not, as he thought, the spirit of Francis Bacon, which really stood between Liebig's earlier teaching and the British agriculturist. The farmer has learnt a good deal since, but the above feeling is still in his mind, as it is in the general mind when, unwillingly, it reads of calories, proteins, and vitamins. The future world will, I think, take a different view. If industrialism increases while the available fertile areas of the globe steadily decrease, and that is the most likely outlook, mankind will best save itself by knowing all that can be known about the economies and the betterments which biochemical science alone can provide. Students of nutrition then work for the future. Nevertheless, I would not have you believe that what has already been accomplished in this domain is of no practical value to the present. Had I leisure, and were this the occasion, I could easily convince you to the contrary. But with regard to the immediate future of biochemistry let me only just say that in all the lines of inquiry just chosen for illustration, and in a score of others, progress is accelerating, for the happy reason that more qualified workers than ever before are now engaged upon them. The science has not yet won universal recognition from those sciences for which it is a borderland, but, as I have already said, traffic across the borders is setting in, I think, to the advantage of all For the main theme of this address is that biochemistry, because of certain attributes it possesses which I have already imperfectly indicated, is, perhaps, more than other borderland sciences, a fitting meeting place for many minds and for many university faculties; though because of other attributes it calls for special discipline and special equipment.

THE CLAIMS OF BIOCHEMISTRY ON MEDICAL THOUGHT.

I would now like, in a few words, to put a final consideration before you. It concerns the status of laboratory science, including biochemistry, as accessory to the progress of medicine. I do not wish to discuss the relations between the medically qualified laboratory worker and the clinician. These, after a period of adjustment, seem now to be most happy. The leaders of the English clinical world indeed officially recognise and superabundantly reward those who from the laboratory have made even the smallest contributions towards the progress of medicine, as I in my own person can testify. It is of the public I am thinking, but of the cultured public as well as the general. The public understands the aims and work of the practitioner and at bottom is deeply grateful for his services: but it has never really placed the laboratory worker. It is apt, perhaps subconsciously, to assume that medicine advances by experience alone. Now, it is no reflection at all upon the great art of medicine, nor indeed upon the clinical investigator, to claim that the great and sudden advances that have occurred in the history of modern medicine have been based upon knowledge first gained in the laboratory. Some would perhaps not agree with this statement, but I think most—and certainly the candid historian—will do so. Clinical observation laid, of course, the solid foundations of knowledge, and laboratory teaching cannot be accepted by the doctor until it has been proven and consolidated at the bedside; but rapid progress, revolutionary steps in advance, must nearly always begin in the laboratory. The reason is obvious. The clinician must in the main rely upon observation rather than experiment. This the public will be the first to recognise. Now the accumulation of knowledge by observation alone (the older method) must always be infinitely slower than the gain of new knowledge by experiment. Certain words of a great English clinical observer struck me when I met them long ago as significant. I have quoted them elsewhere,[3] but I should like to quote them again. The great English clinician, William Jenner, had been striving to convince his colleagues that typhus and typhoid fever are distinct in their ætiology. In this effort, though so entirely right, he was at first unsuccessful. "I considered, therefore," he writes in the preface to his book on fevers published in 1850, "that it was necessary to begin again *de novo* and consult only the voice of Nature—convinced that although the most intellectual might fail at first to comprehend her often ambiguous language, yet that her most humble votaries might, by patience and daily watching, by keeping honest record of every sound she uttered—by joining letter to letter, adding word to word, and line to line—at last spell out her meaning . . ."

Here in fine but almost pathetic terms we learn what the slow task of the observer must be. Jenner felt the ambiguity of Nature's chance remarks, but saw apparently no remedy save in the laborious recording of her spontaneous utterings and a painful effort at interpretation. Nature, however, can be taken into the witness-box and sharply questioned. Moreover, the questions can be so put as to admit of no ambiguity in the answer. That is the method of experiment!

Now the biological laboratory worker is usually at least as disinterested as his fellow-men. In general, perhaps, he craves less than most for public rewards. But he deserves public recognition as an honest citizen and should not remain unclassified in the body-politic. He has become as much an essential unit of the social organisation as any other worker. May I add as my final word that if he happens to be a biochemist, who in common with the physiologist and pathologist must at times employ living animals in his experiments, he may yet be as kind and honest in heart and soul as the best of his fellow-men, carrying out such experiments with the fullest sense of his responsibility to humanity.

A Lecture

ON THE

SENSIBILITY OF THE SKIN

IN RELATION TO NEUROLOGICAL THEORY.

Delivered at the Institute of Pathology and Research, St. Mary's Hospital, London, on June 5th, 1924,

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IN the physiology of the nervous system it is a very obvious proposition that the finer study of sensory function can be carried out only in relation to the human subject. Moreover, if such work is to have more than a very narrowly limited value, it must be concerned with the effects of lesions experimentally produced and observed in the conditions of the physiological laboratory. It was these facts which made the work of Head and Rivers in this field so immediately and manifestly important. This now classical contribution to neurology made available a new method of research, recorded a large body of observations which were the first-fruits of the new method, and enunciated a hypothesis bearing on the fundamental nature of peripheral sensation. The opinion may be ventured that in the ultimate estimation of this work physiology will come to apportion value to its various constituents in the order in which I have named them.

It is probable that no new method of physiological research has been less exploited by other writers than has that of Head and Rivers, and that no equally revolutionary hypothesis has been less criticised or confirmed by repetition of the original experiment. This may well be due to the justly

[3] "Science and the Nation." Camb. Univ. Press.

authoritative status of its makers, as well as perhaps to the rather dry and recondite nature of the subject, and the exacting tedium of the research. It is nearly 20 years since their paper was published, and I am aware of only two attempts thoroughly to cover the same ground. The first of these was undertaken by Morriston Davies and myself, and its first results were published 15 years ago. It embodied the results of a somewhat prolonged study during which observations were made on seven different areas of sensory disturbance experimentally produced by nerve section and suture in one or other of the two subjects.

Our results, when compared with those of our predecessors, showed in the first place a certain general agreement as to the facts of observation; secondly, showed a divergence in regard to certain observations which we could not but regard as critical; and thirdly, they appeared when the utmost allowance for interpretation had been made, to be incompatible with the hypothesis of peripheral sensation at which Head and Rivers had arrived. I do not propose to trouble you with a critical examination of these divergences. Since, as it seems to me, they are not wholly to be explained as differences of interpretation, they can best be determined by further experimental evidence. The consideration of what additional evidence is now available would, however, be a digression from the limited subject I propose to deal with to-day. My intention is rather to make some comments on the hypothesis of Head and Rivers in its general neurological aspects, and then to indicate certain other considerations which seem also to be suggested by the facts.

THE HYPOTHESIS OF HEAD AND RIVERS.

It seems scarcely necessary to describe in detail so well-known a doctrine as that of Head and Rivers, but to avoid ambiguity I should perhaps remind you of its general features. According to these observers each cutaneous sensory nerve contains two systems of fibres which differ in function, in distribution, and in the rate at which they regenerate after section. One of these systems is concerned with what may be regarded as the less highly evolved forms of sensation (pain and sensibility to thermal extremes); it yields sensations of a peculiar intensity—usually disagreeable, tending strongly to produce a motor response, and having peculiarities of localisation; it regenerates readily and earlier than does the other system, and in distribution it is freely overlapped. The other system is concerned with what may be regarded as the more highly evolved forms of sensation (light touch and sensibility to intermediate temperatures); it regenerates less easily and more slowly than does the first system. When present and functioning in a given area of skin it inhibits the peculiarities of quality and localisation which sensibility would have if it were dependent on the first system alone. To these two hypothetical systems of nerve fibres Head and Rivers gave the exceedingly apt and attractive names of protopathic and epicritic respectively.

The main fact on which this hypothesis is based is that sensibility in an area of skin of which the sensory nerve is regenerating possesses certain peculiarities of which an intensification of quality and a certain displacement of localisation are the most characteristic. This fact is wholly incontestable, though it is not equally certain how constant an accompaniment of regeneration these peculiarities of sensibility are. They were certainly present in all the seven experiments in nerve section made by Davies and myself. Certain further and less definitely established observations are necessary for the support of the hypothesis.

When a cutaneous area is deprived of its nerve-supply, since the area of epicritic loss is greater than the area of protopathic loss, the central region which is deprived of both forms of sensibility must be surrounded by a margin which retains protopathic sensibility only. According to the hypothesis this intermediate zone, as it may conveniently be called, should possess a form of sensibility substantially identical with that peculiar sensibility characteristic of regeneration. This identity Davies and I were quite unable to confirm, and we found reason to regard the intermediate zone as a mere region of defective sensibility of all forms gradually increasing in depth from its margin inwards.

A further group of observations essential to the validity of the hypothesis is, first, that during regeneration the return of epicritic sensibility is greatly delayed, and secondly, that with this return of epicritic sensibility (e.g., sensibility to light touch) the sensibility of the area in which regeneration is occurring loses those characters of intensification of quality and displacement of localisation it formerly possessed. In neither of these essential requirements did our observations confirm those of Head and Rivers.

As I have already said, I shall do nothing here by way of critical discussion or detailed examination to enforce the bearing of these discrepancies of observation. They are mentioned only as they necessarily gave rise to the suggestion that the protopathic-epicritic constitution of the cutaneous nerves could scarcely be regarded as definitely established, and that possibly further consideration might afford at least an alternative method of regarding the facts.

When we take a general view of this hypothesis, it is difficult to guard ourselves from taking its compactness, its symmetry, and its self-consistency as in some way contributing to the proof of its validity. To yield to such an inclination is perhaps the most subtle and tempting fallacy to which neurological speculation is exposed. The history of science has shown time and again that these marks of a biological and especially of a neurological conception are often not merely irrelevant as evidence, but actually a ground of suspicion that the conception in question contains too large an amount of the abstract and the unreal. Indeed, it may perhaps fairly be said that the hypothesis of Head and Rivers has enough in it of essentially abstract elements to make a real difficulty to its being accepted as representing a neurological reality.

I do not propose to trouble you with any attempt to discuss this very difficult department of the theory of method, and I can only indicate one or two of the aspects of the hypothesis which seem to me dangerously abstract.

We are to regard the protopathic system as more or less definitely representing an evolutionary phase in which it constituted the sole sensory apparatus of the skin. The hypothetical primitive animal of this stage is thus supposed not merely to be without the power of appreciating intermediate temperatures and of localising contacts, but without the power of appreciating light touch. It is difficult not to regard such a conception as a highly abstract one, and very much out of relation with biological reality. There is, as far as I am aware, no biological evidence for regarding sensibility to light touch as less primitive than any other form of sensibility.

Again, one may mention the effect of the epicritic system in totally inhibiting the characteristic qualities of protopathic sensibility. It is suggested that both in the evolutionary process, and during regeneration in the individual, the mere appearance of epicritic sensibility neatly and absolutely effaces the very remarkable qualities of protopathic sensibility, which, however, remain merely concealed and ready immediately to reappear if the epicritic system is withdrawn. Quite apart from the question whether this is or is not an established fact of observation, the conception would seem to need the closest examination before it could be accepted as a definite neurological principle. Difficulties of this class may seem to be unimportant unless we constantly remember the vital need in all matters of neurological theory for realistic rather than abstract thought. I shall make no attempt to deal further with this aspect of the subject, however, beyond pointing out one assumption that seems to me to be made in the work of Head and Rivers, and to be of serious importance. It is taken for granted that all the consequences of division and suture of a nerve are what we may call physiological or normal, and that any peculiarities of sensibility in the affected

area of skin are merely due to defects of nerve supply, and represent stages in the orderly return of function. These observers do not seem to have contemplated the possibility that section of a nerve may in itself be a serious pathological accident, the possible effect of which on the character of sensation might be worth considering. Even the most general consideration would seem to suggest that we are exposing ourselves to the risk of error if we assume that the local consequences of division and suture can be ignored, and that our sole task is to observe and record the regular and punctual return of function.

THE EFFECTS OF A NERVE SECTION.

There are abundant and familiar facts pointing in a precisely opposite direction. In the first place, the restoration of function, even after the most careful suture of nerves, is notoriously uncertain and apt to be greatly delayed and incomplete. Secondly, the site of the division and suture of a nerve is the seat of pronounced activities which are readily observable histologically. These activities are partaken in by the nerve and by the surrounding tissues. On the side of the nerve there is at the proximal end an active outgrowth and ramification of the axis-cylinders which pour out from the cut surface in a veritable spray, and invade not merely the peripheral end of the nerve but the surrounding tissues as well. On the side of the tissues surrounding the divided nerve there is an equal activity, the tendency of which is to form a dense fibrous tissue that restrains the escaping axis-cylinders and protects the surrounding parts from unlimited invasion by them. These processes are seen in their highest development in the well-known bulbous end or "amputation neuroma" that always follows the simple transverse division of a nerve. Here are very well seen the extreme activity of the outgrowing axis-cylinders, and the very great density of the fibrous capsule with which the surrounding tissues defend themselves. It is so general a rule in pathology that disturbances of function precede any obvious alteration of structure in the affected part that it would be at least remarkable if these very pronounced structural changes had no functional counterpart at all.

That this activity is not, in fact, without effect on the function of the nerve is shown by the well-known sensory phenomena that follow amputations even in the total absence of infection of any kind. That the outgrowing axis-cylinders are subject to excitation in the amputation neuroma is made evident by the persistence of "phantom" limbs after amputations. The degree of this excitation is very variable. Sometimes it is very severe and the phantom limb is the seat of very painful and distressing sensations. More usually equilibrium in the neuroma is gradually established, and the persistent sense of the limb slowly fades. From facts such as these certain conclusions of general application seem to follow. First, it is clear that the division of a nerve, followed by however exact and aseptic a suture, must always be an important event in the neurological sense and one that gives rise to indefinitely great possibilities in the way of disturbed function. Secondly, the significance of such an event lies in the coming into contact of bare axis-cylinders with adjacent non-neural tissues, and the energetic reactions set up in consequence.

The occurrence of these reactions and the fact that they are capable of producing functional disturbances of the affected area, suggested to Davies and me the possibility that in this direction might be found some light on the marked peculiarities of the sensibility of recovering areas. Of these peculiarities, the most striking, and undoubtedly the most important, is the intensification of sensations. This character is in no way a hyperæsthesia, since the sensation may need an abnormally strong stimulus to elicit it, but is concerned entirely with quality. This intensified quality—which is most easily observed with pain and cold sensations—gives to the sensation a kind of explosive vividness and brilliance which constitute a wholly new experience. There can be no question that the intensification of sensation is the essentially significant fact in the phenomena accompanying regeneration.

The conception that the direct contact of neural and non-neural or, as we may perhaps call them, somatic tissues is always a significant event neurologically and capable of producing widespread functional disturbance, naturally led us to inquire whether in the nervous system in general such an occurrence is provided against as thoroughly as the hypothesis seemed to require.

THE INSULATION OF THE NERVOUS SYSTEM.

Considered in the most general way, the nervous system is a collection of tissue the essential function of which is the capacity to act upon and be acted upon by the other tissues of the body. This character in one aspect is the power to stimulate and be stimulated by the somatic tissues, and in another aspect is an incapacity to tolerate direct contact with them—an inveterate and probably physico-chemical incompatibility with them. It is essential, therefore, that the qualitative difference between neural and non-neural tissues should be kept sharp, and, on the other hand, that contact between the two kinds should be absolutely restricted to points where interaction is necessary.

In actual anatomical fact such insulation is unmistakably traceable. In the case of the central nervous system the dura mater is the principal insulating medium, in the case of the peripheral nerves the neurilemma sheath. Every element of the nervous system is kept from contact with somatic tissues either by the dura or by a neurilemma sheath, and in this insulation there is no chink except those very restricted ones which allow of contact for functional purposes.

The function of the dura has generally been regarded as chiefly mechanical and supporting. Familiarity with its physiology and pathology shows its insulating function to be far more important. If a segment of cerebral dura is excised and the subcutaneous tissues of the scalp left in contact with the brain, a new segment of dura immediately begins to form in the gap and in a few weeks is indistinguishable from the old—that is to say, it has the same dense impervious substance and the same endothelial surface within and without. It is apparently formed by a reaction in the non-neural tissues from contact with the brain by a process perhaps similar to that by which contact with naked axis-cylinders leads to the formation of the amputation neuroma.

The cerebro-spinal fluid also posseses the neural characteristic of exciting dura formation. If the spinal dura is incised and the fluid allowed to escape into the tissues, it excites around it the formation of a sac continuous with, and in character indistinguishable from, the normal dura. This fact, that wherever cerebro-spinal fluid is a dura will form round it, explains the uniform failure of all attempts to drain the fluid of hydrocephalus into extra-neural regions. The size of the central nervous mass has necessarily involved its free penetration by blood-vessels non-neural in their nature. The more or less complete absence of neurilemma in the brain and cord has rendered necessary the insulation of these vessels to compensate for the absence of insulation of the individual nervous elements. This is effected by the exact enclosure of all vessels in the so-called perivascular lymphatics which from this point of view are seen to have a very definite and important function. When we see how precisely insulated is every somatic element that penetrates the brain or cord, it becomes clear that no general framework of connective tissue would be possible there, and we may infer that the neuroglial stroma of the central nervous system owes its existence perhaps less to its being in any special degree fitted for the mechanical support of nervous elements than to its being of neural origin and so able to exist in contact with active nervous tissues without reaction.

Outside the dura the insulating function is taken on by the neurilemma which is everywhere continued

unbroken to the functional termination of the axis-cylinder.

PATHOLOGICAL CONSIDERATIONS.

It is possible to trace in pathological phenomena further evidence of the reality of what we may call neuro-somatic incompatibility and the importance of neural insulation. One very striking fact is the inaccessibility of the actual parenchyma of the central nervous system to certain drugs—for example, anti-syphilitic remedies. This fact, wholly unexpected as it was to ordinary physiological notions, is perhaps especially interesting in its bearing on principle, since it led to the invention of those extremely plausible abstractions para-syphilitic diseases. It seems scarcely possible to doubt that this ultimate impenetrability of the brain and spinal cord is an expression of the degree to which insulation is carried. Again, certain features in the behaviour of some intracranial tumours can only be explained when we grasp the depth of the incompatibility of neural and non-neural tissues. The dural endothelioma as regards the dura, the skull, and the scalp is capable of behaving as a typical malignant neoplasm with infiltrating spread and ulceration. As regards the brain, however, it is always benign; it may compress it and even become deeply embedded in it, but it never in any circumstances infiltrates the cerebral substance. The glioma, on the other hand, may infiltrate the brain substance, but though it may thin the skull by pressure, it never invades it. These growths thus show their essentially non-neural and neural origins respectively, and always remain true to type.[1]

Of pathological facts bearing on the importance of neural insulation those illustrating its breakdown are perhaps the most interesting. The ordinary neuro-fibroma bears a considerable resemblance in structure to the amputation neuroma, being made up of convoluted nerve-fibres embedded in a dense fibrous tissue. It seems reasonable to suppose that it is essentially of the same nature and owes its origin to an escape of axis-cylinders from their normal insulation as the result of the weakening of this by injury or disease. In Recklinghausen's disease the suggestion is strong that we have to deal with a widespread primary weakness of the insulating mechanism leading to multiple escapes of axis-cylinders, each "leak" producing the inevitable reaction in the form of a neuro-fibroma. Such neuromata are, of course, very much the most common in the peripheral nerves, but they do occur within the spinal canal and within the cranium. It is interesting to notice that those neuromata that occur inside the dura are not usually made up of the dense hard fibrous tissue met with elsewhere, but are usually much softer, more cellular, and apt to undergo degenerations and cyst formation. This is just the variation one might expect, since within the dura the reaction to an "escape" must be less vigorous and the available non-neural tissue capable of reacting to it very strictly limited in amount.

INSULATION OF SENSORY NERVE-ENDINGS.

In tracing the various mechanisms by which the insulation of neural tissues from the non-neural is maintained, we have not yet considered the state of affairs at the terminations of the peripheral nerves. Three conditions are found each of which has its special significance. The end-organ of motor nerve-fibres seems to be one of the regions in which some kind of contact between neural and non-neural tissues is allowed in order that the action of one upon the other should be possible. Thus we find that the neurilemma sheath of the nerve-fibre is continued into the sarcolemma of the muscle-fibre so that the two tissues are brought together while no other contact is permitted.

The second type of structure is that in which most of the ultimate branches of sensory nerves appear to end. With a good deal of variation in construction, and under many names which we need not enumerate, these end-organs have certain common features of structure. In general, we may say that all forms show a strongly developed laminated capsule within which the naked nerve-fibre finds its termination. Here, again, the element of insulation is clearly recognisable and the loss of the neurilemma is compensated for by a thick capsular structure. It has been generally supposed that these various terminal bodies owe their peculiarities of structure to the function they fulfil of transforming the physical stimuli they receive into the nervous impulses which give rise to the corresponding sensations. However this may be, it is difficult to avoid regarding the common feature they all show as evidence that the sensitive terminal nerve-fibrils are in very special need of absolute insulation from the other tissues.

The third type of structure that is found is the terminal arborisation. Here the fibril breaks up, loses its neurilemma, and in its uninsulated condition ramifies among the cells of the epidermis. When we see that everywhere else, without exception, the nerve-fibre throughout its course, up to and including its termination, is provided with an absolutely unbroken insulation, we cannot fail to regard the free arborisation as a remarkable anomaly. Now we know that these free nerve-endings are those of the fibres concerned with pain sensations, for they are the only ones that occur in the cornea, where the only form of sensibility is that for pain. Pain, then, is peculiar among sensations in being originated in and transmitted by a nerve-fibre of which the terminal ramification is uninsulated.

Up to this point we have reviewed a certain amount of evidence pointing to the possibility that the peculiarities of sensibility found in areas supplied by regenerating nerves are consequences of the abnormal conditions that necessarily accompany section and suture of a nerve. We have seen that where this operation is done conditions are set up which are minutely and elaborately guarded against throughout the nervous system. We have seen that these conditions are capable of producing disturbances of nervous function, and that the only state at all resembling them allowed in the normal is that of the end-organs of the pain nerves.

CHARACTERS OF PAIN SENSIBILITY.

This remarkable coincidence naturally tempts one to make some closer inquiry into the mechanisms of pain. Pain has long been recognised as peculiar amongst sensations in having no specific stimulus. All other sensations are excitable by one stimulus which can be expressed as a simple physical process. Touch is excited by a moving contact, heat by transference of heat to the body, cold by abstraction of heat from the body. Pain, on the other hand, is excited by a whole series of stimuli which cannot be generalised under any single character except perhaps the rather fantastic one that they might be harmful if they were stronger. The anomalous nature of the pain nerve is well shown in its ready excitability by the harmless faradic current and its complete indifference to the harmful X ray.

In comparison with the stimuli which excite the other forms of skin sensibility, those which are effective for the pain nerves are relatively gross and energetic. Again, the quality of the sensation pain is quite different from any other sensation in possessing a certain explosive suddenness and in impelling to some kind of motor response. In respect to its high threshold, its intensity, and its tendency to produce motor responses the pain of normal sensibility bears in its subdued degree a decided resemblance to the general characters of sensibility in the recovering area. It seems natural to suspect, therefore, that if the latter form of sensibility owes its peculiarities to an undue exposure of the recovering axis-cylinders to somatic contact, the normal pain fibre owes its anomalous characters, in comparison with other sensory fibres, to its terminal arborisations being exposed in a certain degree to a similar influence.

According to this view the essential fact in the physiology of pain is that the sensation is set up in

[1] The mysterious delay and even arrest in the evolution of a glioma that sometimes follows the making of a simple decompressive opening in the bone and dura over it is, perhaps, worth remembering in this connexion.

fibres which are maintained in a special and peculiar condition, the consequence of which is that while they are not particularly sensitive to excitation, when they are adequately excited they yield an excessive response.

EVOLUTIONARY CONSIDERATIONS.

The result of this discussion has been to bring out the fact that in the peripheral sensory nerves there are two sharply differentiated classes of fibres: first, the pain fibres relatively insensitive to fine stimuli, but, as it were, "set" to yield energetic explosive responses; and, secondly, the fibres for tactile and thermal sensation sensitive to the finest stimuli and, as it were, muted down to yield only sensations of a mild and non-explosive quality in regard to which unperturbed discrimination becomes possible. What we may ask is the relation to one another of these two classes.

Between the lower invertebrate with a diffuse plexus-like nervous system scattered amongst the tissues, and the higher vertebrate with a definitely marked-off central nervous system, it is very obvious that a great change in the direction of centralisation has occurred. At the same time a change much less conspicuous but equally great has probably occurred in the direction of insulation and the complete differentiation and isolation of neural and non-neural tissues. Such a change, if our general argument is valid, would be necessary to effect the general damping down of sensation and the reduction of its urgency which alone would render possible the discriminative and deliberative delay of response that is characteristic of the higher animal. We need not suppose that any form of cutaneous sensation experienced by us is unrepresented in the invertebrate, but there seems to be some ground for suspecting that in the latter all forms of sensation normally have some of the urgency that survives in us only in the case of pain. According to this view it is the damping down of a large proportion of sensory fibres by complete insulation that has given us the finer kinds of cutaneous sensibility and enabled us to make deliberate rather than impulsive reactions to the majority of our contacts with the outer world.

As I have already suggested it seems difficult to suppose that in the evolution of cutaneous sensibility a stage has been passed through in which the animal was insensitive to so important a stimulus as light touch. The evidence is rather in favour of sensitiveness to moving contacts being as elementary and as primitive as any other sensory endowment of animal organisms. As long, however, as such stimuli give rise to sensations urgent in quality and impelling to immediate motor response, their value in bringing the animal into relation with its environment must be limited. It is the qualitative change which restricts these characters to sensations set up in the pain mechanism that allows the discriminative forms of sensibility to acquire their full value.

This discussion is not intended to embody a full and consistent theory of cutaneous sensibility. It is concerned with three apparently isolated groups of facts: (1) The peculiarities of sensibility in skin supplied by regenerating nerves as determined by experiment in the human subject; (2) the physiology of the pain mechanism; and (3) a certain group of facts in the structure and pathology of the nervous system bearing on its relation to the other tissues of the body. The purpose of the discussion has been to bring into correlation these three groups of observations and to show, however tentatively, that they can all be regarded as illustrating a principle fundamental to the very essence of a nervous system.

Bibliographical Note.

The work of Head and Rivers was published in *Brain*. The first of their series of papers appeared in 1905. All are to be found in Head's "Studies in Neurology," London, 1920, two vols. The observations of Morriston Davies and the author of this lecture are embodied in Experimental Studies in the Innervation of the Skin, *Journal of Physiology*, 1909, and the Peculiarities of Sensibility found in Cutaneous Areas Supplied by Regenerating Nerves, *Journal für Psychologie und Neurologie*, 1913. An elaborate paper based on an experimental nerve section in the human subject was published by Boring in 1916, Cutaneous Sensation after Nerve-division, *Quarterly Journal of Experimental Physiology*, vol. x., No. 1.

SPINAL ANALGESIA.

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DURING the period May 1st, 1922, to Dec. 10th, 1923, I have done 400 operations under spinal analgesia on patients ranging in age from 10 to 78 years with no death that can fairly be ascribed to the stovaine employed. Two cases, it is true, died on the table, but both were in a moribund condition from perforated gastric ulcer of 36 hours' duration, and from acute gastro-duodenal ileus respectively. Another case should in fairness be mentioned. It is that of a man of 72, who died three days after radical cure of a large strangulated inguinal hernia, the cause of death being "pulmonary œdema." There was marked bronchitis before the operation. As the result of analgesia his systolic blood pressure dropped from 138 to 68 mm. He was practically unconscious during the whole operation, being apparently in a deep sleep, but he woke up and seemed perfectly normal before leaving the theatre. There was no change of colour, and respiration was slow and snoring, as might occur during sleep. The dose of stovaine was 0·05 g.

I make use of spinal analgesia in every available case, that is to say, in all operations below the diaphragm, when the patient consents and is not too young to be controlled, except in trivial operations not expected to last more than 5–10 minutes. A detailed list would take up too much space. Suffice it, therefore, to say, as showing the scope of the method, that it includes gastro-jejunostomy with appendicectomy (33 cases), cholecystotomy (14), perforated gastric or duodenal ulcer (9), appendicectomy (37 acute, 34 chronic), colotomy (15), hysterectomy (13), ectopic gestation (8), radical cure of hernia (36), strangulated hernia (14), amputation through thigh for senile and diabetic gangrene (13).

It must be admitted that 400 is a small number from which to draw statistical conclusions; nevertheless, the following comparisons may be of interest.

Of *operations that have been done under both spinal and general* (excluding, of course, all operations above the diaphragm and all below it that have not actually been done in this series by both methods), there have been:—

Under spinal (my own cases)—
400 with 22 deaths: death-rate 5·5 per cent.
Under general (surgical staff, including myself)—
1737 with 113 deaths; death-rate 6·5 per cent.

Excluding from the above figures all operations where the death-rate was nil under both methods—e.g., radical cures and inguinal and femoral hernia, curettage, piles, &c.—there remain:—

Under spinal—
241 with 22 deaths; death-rate 9·1 per cent.
Under general—
1116 with 113 deaths; death-rate 10·1 per cent.

By either standard the figures for spinal are 1 per cent. more favourable than for general.

Advantages of Spinal Analgesia.

Let me sum up what I consider to be the advantages of spinal analgesia

1. It is safer than "general." It can be used where ether is contra-indicated—e.g., in subjects of chronic bronchitis, arterio-sclerosis, chronic nephritis, acidosis, diabetes. Some of my cases are striking illustrations of this.

2. There are no chest complications. In this connexion it will readily be granted by all surgeons of experience that the fatal cases of ether bronchitis and pneumonia by no means represent all the anxieties and troubles arising through pulmonary irritation by ether in the elderly and fat type of patient. The surgeon who has never had the mortification of seeing his laparotomy wounds burst open, or their healing delayed from the strain of incessant coughing, aided perhaps by post-anæsthetic vomiting, has been lucky beyond belief. I repeat, there are no chest complications after "spinal."

3. The comfort of the patient is vastly increased. For the spinal patient there is none of the horror of "going under" or "coming out"; no struggling, no suffocation, no nausea, no vomiting, no outrageous thirst, no vile smell and clinging taste of ether. There is no post-anæsthetic headache with the technique employed. The patient can talk cheerfully to his friends immediately after the operation. There is no need for a special nurse, as after a general anæsthetic, to watch him, sometimes for hours, until he comes round. Except in gastric cases, fluids can be given by mouth immediately after, indeed, during the operation, which is much more comforting than fluid per rectum. An important point is that Fowler's position is possible immediately the patient returns to his bed, a saving of most valuable hours in acute abdomens with pelvic drainage, where every minute counts. Convincing proof of the advantage of "spinal" over "general" from the patient's standpoint is afforded by strolling successively through two wards that are in the throes of a "spinal" and "general" field-day respectively. One suggests a convalescent home, the other the deck of a cross-Channel packet in dirty weather.

4. There are practically no anæsthetic anxieties, no gagging, tongue pulling and piercing, no alternations of light with almost lethal anæsthesia.

5. Complete muscular relaxation can be counted on during the whole operation, affording excellent access to, and easy exit from, the abdomen. In laparotomies for intestinal obstruction, for example, there is no avalanche of bowels, and no trouble in closing the peritoneum. In rectal operations the sphincters are completely relaxed and need no stretching.

6. The duration of the operation is not of such vital importance, since the dose of analgesic is given once for all, and is easily sufficient for an hour.

7. There is no shock from the operation, the posterior nerve roots being virtually severed temporarily as regards the transmission of stimuli.

8. No special anæsthetist is required; an advantage in hospitals, especially at night, to the resident who would otherwise be called upon to anæsthetise an urgent case, a class of case which, above all others, demands but seldom gets the most skilled anæsthesia available.

9. The patient can be consulted during the operation when necessary, and I can recall cases where this has saved the necessity for a second operation.

10. The air of the theatre is the purer for the absence of ether and chloroform fumes, which makes "field-days" less tiring to all concerned.

Disadvantages of Spinal Analgesia.

As regards disadvantages, I know of none, provided the technique be correct, save the slight extra work which devolves on the surgeon. Only one of my cases, a member of our nursing staff, complained of headache after operation. In her case this was of a mild neuralgic character in the occipital region and radiating over the posterior surface of the neck on the right side. It did not begin until three days had elapsed since the operation (appendicectomy) and was easily controlled and cured by aspirin. Recently a man aged 70, after a radical cure of bilateral inguinal hernia (that on the left being strangulated), developed within two days what at first was taken for a large burn over the front of the left tibia; I now think this is a trophic ulcer due to injury to the cauda equina. It is healing rapidly. These two were the only cases in the whole series with sequelæ requiring treatment. Catheterisation after operations for piles and hernia is required far less frequently after "spinal" than after "general."

In three cases there was complete failure of analgesia and ether anæsthesia was required:—

1. Gastro-jejunostomy, where a badly fitting needle allowed the stovaine to escape.

2. Gastro-jejunostomy, where a full dose of stovaine was delivered intrathecally. The failure was probably due to intrathecal adhesions, as the patient was syphilitic and had had previous intrathecal treatment with N.A.B.

3. Appendicectomy. Here there was a poor flow of C.S.F., and the stovaine was probably delivered extrathecally.

In another case of gastro-jejunostomy, although analgesia was perfect, the woman was so worried about the apparent loss of her "poor legs" that ether was given to control her. (These four cases are not included in the series of 400.)

There were 13 cases in which analgesia was not perfect:—

Eight of these occurred early in the series, when, in the light of further experience, an insufficient dose of stovaine was used.

Two cases (both gastro-jejunostomy), after full doses of stovaine, required a small amount of ether. They occurred consecutively the same afternoon. The ampoules used were the first of a new box and were probably faulty.

Three cases were uncomfortable towards the end of the operation, but no general anæsthetic was given. The operations were respectively: gastro-jejunostomy (0·07 g. stovaine), for complete transverse rupture of the jejunum at its junction with the duodenum (0·07 g.), and appendicectomy (0·04 g.). In each case the dose of stovaine was too small.

Technique.

Morphia, gr. ¼ (gr. 1/12 for 10 years old), 20 minutes before the lumbar puncture, is the routine in all cases. Ordinary lumbar puncture needles, not specially fine ones, are used in all cases except the very fat, for whom I have had a special set made two inches longer than normal. The needle should be sharp, and its stylet should be an accurate bevelled fit at the point. The needle seating of the 5 c.cm. record syringe must accurately fit the needle. Both needles and syringe are sterilised by boiling in distilled water, and before being charged with stovaine all fluid should be expelled from them. The analgesic employed is stovaine with glucose (Barker's), ampoules of which, containing 0·1 g. of each in 2 c.cm., are supplied by Messrs. Allen and Hanburys. This is the maximum dose such as would be necessary in gastric and liver operations. Three-quarters of this is ample for hysterectomies and for the lower abdomen generally (unless the upper reaches of the abdomen are to be examined at the same time), and one-half suffices for operations up to the groin.

Whilst the needles are being tested and the syringe charged the patient is placed on the left side with the knees and chin held as close together as possible by the nurse. The flat of the back should be vertical. The anæsthetic couch should be capable of being raised at its middle so as to elevate the pelvis. Failing this, flat sandbags should be available for the same purpose.

I always make the lumbar puncture in the middle line, never to the side, usually between the second and third lumbar spines, sometimes between the first and second. The dense interspinous ligaments then act by their resistance, tightly embracing the needle, as a most efficient guide. Puncture of the dura can be heard as well as felt, when at once the progress of the needle is checked. It is never necessary to make more than one puncture through the skin. This is important, since this is the only painful part of the procedure. If for any reason the needle has to be withdrawn and reinserted, the same puncture can always be used by stretching or moving the skin over the spines. I never withdraw any C.S.F., and am of opinion that the cases of "spinal" cephalagia reported from Paris are due to the routine withdrawal of from 20 to 30 c.cm., and, to a lesser extent, the use of stovaine-billon, which depends for its effect on its diffusion through the subarachnoid space, a process difficult to control or limit. As soon as the flow of C.S.F. begins the dose of stovaine is slowly injected, collodion applied to the puncture, and the patient rapidly turned over on to his back. The head is strongly flexed and the pelvis raised to a height varying with the height of analgesia required. Being of higher specific gravity than the C.S.F., the stovaine-glucose runs up the cord to the desired level. Five minutes suffices for analgesia up to, and slightly beyond, the costal margin; three minutes is enough for operations below the groin. The head must be kept flexed during the transfer to the operating table, during the whole operation, and during the journey back to the ward. This prevents

any danger of paralysis of the medullary centres and of post-operative headache. A screen is arranged to shut off the patient's view. It is important that there should be no unnecessary noise. Adrenalin, camphor, and pituitrin should be in readiness, though they are rarely required.

It is important to remember that the Trendelenburg position cannot be employed with safety. It is, however, found to be unnecessary even in hysterectomies, as the bowels pack away easily under the relaxed abdominal walls. The patient sometimes complains of faintness, for which, except in gastric cases, a little brandy or aromatic spirit of ammonia can be given. Slight and transient nausea or vomiting may occur (due, I believe, to an insufficient interval between the morphia and the lumbar puncture), but is never embarrassing. It is usual to give drinks of water or soda-water during the operation. There is always a fall in the systolic blood pressure, usually not more than 15–20 mm. In some cases, however, it is greater, and may cause slow pulse and pallor. In cases where this may be expected, and in patients whose initial blood pressure is low—e.g., after severe hæmorrhage—1 c.cm. of pituitrin is given after the lumbar puncture. In any case of the sort 10 minims of adrenalin (1–1000) intravenously is very effective. Pituitrin should not be given in gastro-jejunostomies. In one of my cases it caused such contraction of the gastric musculature as to make the operation most difficult.

In three cases of high analgesia the patient complained during the operation of aching, cramp-like pain under the scapula. It required no treatment, and did not interfere with the smoothness of the operation. The usual and normal experience is one of deep peace and tranquillity both for patient and surgeon.

STUDIES IN THE MALE BREAST.

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THE mammary tissue of the male is the leading, if not the only example of an external secretory mechanism which persists without actual or potential function. Fig. 1 shows a typical section of male breast. Ten specimens of the normal male breast from post-mortem subjects at the London Hospital between the ages of 6 months and 65 years were submitted to histological examination. In all glandular tissue was present.

Congenital Abnormalities.

(1) *Absence.*—Complete absence is exceedingly rare. Sir Jonathan Hutchinson described a case in a boy aged 3½.

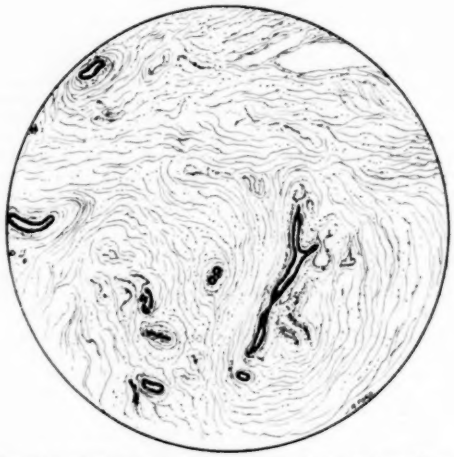
(2) *Supernumerary Nipples.*—Sir Arthur Keith has shown that accessory nipples occur upon a line extending from the anterior axillary fold to the groin. In certain communities these accessory nipples are relatively common; they were observed in 19 per cent. of 100,000 German recruits. In 100 consecutive male out-patients I was able to find them in only 2 per cent. They are liable to be mistaken for warts.

Hypertrophy.

(1) *Unilateral Idiopathic Hypertrophy.*—There are about 150 cases of this pathological curiosity on record. At puberty one breast enlarges and presents the characteristics of a well-developed female breast. Two cases of this kind have been operated upon at the London Hospital within the last 20 years.

(2) *Bilateral Idiopathic Hypertrophy.*—Gruber, of St. Petersburg, in 1866 collected 54 cases of male mammary hypertrophy. The breasts usually commence to enlarge at puberty, less frequently the hypertrophy is seen in childhood. Helen Ingleby described two cases in male children aged 7 and 8 respectively. Hyperplasia of the male breast is probably due to relative inadequacy of the internal secretion of the interstitial cells of the testes. Nevertheless, the subjects of this deformity are often virile—Chingawayo, the chief of the Zulus, a gynækomast, at the age of 55 had 40 wives and over 100 children. Although pseudolactation is most exceptional, cases have undoubtedly occurred. Schnetzer gives an account of a man whose breasts secreted 64 g. of fluid in 24 hours. Other German observers have noted similar though less striking instances. The secretion is not true milk, but has the appearance and chemical composition of colostrum. There is

FIG 1.



Drawing of microscopic appearance of typical section of male breast.

no evidence to show that the male has ever secreted true milk. Tribal tales of the father nurturing his motherless infant with milk from his own breast belong to the realms of surgical mythology. The ducts and acini are there, but the hormonic stimulus to activate them is always lacking. When the physiologist has isolated and compiled synthetically the specific hormone to stimulate artificially the mammary gland to physiological activity, the day may come when the male wet-nurse and the lactating bullock are commercial possibilities. The treatment of idiopathic hypertrophy is excision of the breast, for the deformity is liable to react upon the mental outlook of the patient.

(3) *Hypertrophy Associated with Anorchism.*—It is well known that the male tends to assume female characteristics after castration in early youth. I am indebted to Prof. Turnbull for the following example of gynækomasty and gigantism in association with anorchism:—

A married man, aged 55, was admitted for heart disease to the London Hospital on April 19th and died on May 7th, 1910. At necropsy he was found to have subacute bacteriæmic endocarditis, a fibrosis of the liver of the "hob-nail" type, slight fatty infiltration of the pancreas, and a few small fat necroses in that gland. The corpse measured 6 ft. 3 in. in length, and weighed 15 st. 9 lb. A femur was excised and was found to be very large and heavy, but of normal texture. The breasts were large and prominent, but no secretion could be expressed from them; the ducts and ductules on microscopic examination were found to be six times as wide as in control specimens from men of various ages; the ducts contained a few desquamated epithelial cells, and some of the ductules a hyaline coagulum. The penis resembled that of a boy of eight or nine years of age. There were a few hairs on the mons Jovis, and a trace of down upon the upper lip; the limbs and remainder of the trunk appeared hairless. The prostate was puerile. A firm cord passed on either side from small seminal vesicles to be attached to the base of the scrotum; microscopic sections of the scrotal extremities revealed a solid cord of involuntary muscle, surrounded by adipose tissue which contained spermatic vessels and a few small bundles of smooth muscle; there was no trace of testis or epididymis. The pituitary body was enlarged,

measuring 1·4 by 1·7 by 0·8 cm.; eosinophil cells were massed in the central and posterior two-thirds of the anterior lobe, there were many conspicuous groups of large cyanophil cells in the remainder, and the tubules in the pars intermedia were distended with colloid. The thymus was replaced by fat. The thyroid gland, the pineal gland, and the suprarenal bodies were of ordinary appearance. No operative scars could be detected.

(4) *Hypertrophy following Malignant Teratoma of Testis.*—The male breasts may enlarge under the influence of abnormal gonadal internal secretion. This is illustrated by the following case:—

Motor mechanic, aged 32, admitted into London Hospital under Sir Hugh Rigby. March, 1923, orchidectomy for malignant left testis. Histological report: Malignant teratoma. May, complained of right breast getting larger. No pain. July, massive secondary deposits in lumbar glands became manifest. The breasts steadily increased in size. October, died. A necropsy showed simple hypertrophy of the breasts.

Parenchymatous Mastitis.

(1) *Mastitis of Infants.*—Is at least as common in the male as in the female. Its ætiology is closely related to the lactation of infants. On the third or fourth day of life, if the mamma of the infants be lightly pressed, a drop of colourless fluid can be expressed; a few days later there is often a slight milky secretion, which finally disappears in the third week. This is the "witch's milk," which observers have analysed and found to contain the essential characteristics of colostrum. The most ingenious (but not altogether satisfactory) explanation of this phenomenon is that the hormone which stimulates the mamma of the mother to physiological activity reacts also upon the newly-formed mammary tissue of the fœtus. In support of this theory it has been observed that in those infants whose breasts secrete plentifully the mother tends to produce large quantities of milk. The infant, with its breasts in physiological activity, is liable to the same danger of a retrograde bacterial infection as its mother. The cause of mastitis of infants is not the ignorant maternity nurse "breaking the nipple strings," for it occurs in babies born in hospital. Furthermore, the misguided midwife presumably limits her activities to the female infant's breast; and all who deal with the new-born appear to be agreed that mastitis of infants is, if anything, commoner in the male. Thus the midwife is exonerated. "Mastitis of infants" is essentially a physiological activity. It may lead to a true mastitis by retrograde infection. This true mastitis usually resolves; occasionally it suppurates. The following is a typical case in point:—

A male, aged 19 days, breast-fed infant, was recently admitted to the London Hospital under the care of Mr. A. J. Walton. The mother had been discharged from a maternity hospital seven days before. The baby's breasts were then swollen and secreting milky fluid. Two days before admission the left breast became red and painful. On admission there was a purulent exudate from the nipple and an abscess occupied the left breast. The breast was incised.

It is highly probable that some cases of persistent retraction of the nipple in after-life in both sexes are due to infantile mastitis. Primary abscess of the male breast in adolescent and adult life is seldom seen. Tuberculous mastitis is rare and usually secondary.

(4) *Mastitis of Puberty.*—This condition is frequently encountered in surgical out-patients. The boy aged about 14 complains of pain and swelling in the breast. In 80 per cent. the condition is mainly or entirely unilateral. On examination the breast is enlarged, tender, and slightly indurated. The treatment is expectant. Irritation should be avoided, and to this end braces are better substituted by a belt. Suppuration never occurs. The symptoms usually disappear in 14 days or less, but the induration was still present five weeks later in one case which was followed.

(5) *Mastitis from Local Irritation.*—This condition is another clinical entity. In civil life it usually occurs in manual labourers with ill-fitting braces. During the war soldiers carrying heavy equipment were seen with the same condition.

(6) *Mastitis as a Complication of Other Diseases.*—This is occasionally seen in mumps.

Interstitial Mastitis.

"*Chronic Interstitial Mastitis*" (diffuse fibro-adenomatous hyperplasia).—Of 11 males operated upon at the London Hospital for this condition six were over 55 years of age. It may thus be assumed that the condition occurs later in life than in the case of the female. All cases were originally unilateral. In two of them a similar condition, requiring removal, recurred in the opposite breast. Prof. Turnbull teaches that normally during the life of a woman the breast is in a condition of instability, undergoing evolution and involution not only during and after pregnancy and parturition, but at puberty, in the climacteric, and even, in many cases, at birth and during every menstruation; and that chronic interstitial mastitis is in reality an abnormal activity of similar nature. Inasmuch as chronic interstitial mastitis in the male presents precisely the same

FIG. 2.

Carcinoma of breast of eight and a half years' standing. Patient cannot completely raise his arm because of cicatrisation around axillary glands (from a photograph).

clinical features and histological appearances as in the female, it is necessary for the above explanation to show that the male breast also undergoes physiological changes. Under the headings "mastitis of infants" and "mastitis of puberty," it has already been shown that the male breast frequently enlarges at birth and at puberty, and these enlargements may be accompanied by the secretion of witch's milk. Further, a series of sections of the normal male breast at different ages showed an increase of the interstitial fibrous tissue as age advanced.

Benign Neoplasms.—(1) Lipoma: Many of the lipomata classified in records of neoplasms of the London Hospital as occurring in the male breast appear to lie in the overlying superficial fascia. True interlobular lipomata are probably infrequent. (2) Fibro-adenomata: These are not exceedingly rare, and present the same clinical features as in the female. Cystadenoma of the male breast has been reported.

Malignant Neoplasms.—(1) Sarcoma: The records of the London Hospital contain two cases of sarcoma of the male breast, both beginning in the subcutis

of the areola, and both occurring in men of middle age. (2) Carcinoma: Roger Williams, in collecting 2420 cases of carcinoma of breast, found that 1 per cent. of the total occurred in males. Of 14 males admitted to the London Hospital for carcinoma of the breast, more than one-third were totally inoperable.

From this fact the conclusion may be drawn that it is not modesty alone that deters the female from seeking relief for carcinoma of breast in the operable stages of the disease, but rather the absolute lack of symptoms. Of the nine men in this series on whom a radical excision of the breast was performed, the histological examinations showed seven spheroidal-celled and two columnar-celled. One of these cases, operated upon 11 years previously, recently returned complaining of hæmoptysis. Examination showed multiple recurrences in the sternum. Carcinoma of male breast runs an extremely atrophic course. Blair Bell described a case of two and a half years' duration. A case of eight and a half years' duration at present attending for X ray treatment at the London Hospital is worthy of notice:—

Carman, aged 44, in 1915 noticed breast was enlarged and bled when it was knocked. Two years later skin became ulcerated. He attended as an out-patient for the first time in August, 1923; his complaint was that he could not follow his occupation because of the inability to raise his arm above his head. He had 18 months before commenced to have difficulty in raising right arm, and 10 months later the left arm became similarly but less affected. Fig. 2 shows the extent of the ulceration and also the extensive cicatrisation of the axilla, which prevents him fully raising the arm. Further interrogation revealed that he had lost 1 st. during the past month, and had been troubled for 10 months with dry cough.

Paget's Disease.—The records of the London Hospital include one example of Paget's eczema of the nipple in a male. The patient was 43 years old. The breast was excised. The microscopic changes were typical of Paget's disease; there was no cancer.

Conclusions.

1. Congenital abnormalities of male breast are less frequent in this country than in Central Europe.
2. Infantile mastitis is not (as is commonly believed) traumatic in origin. It is a physiological activity which favours a retrograde bacterial infection, and thus may result in a true mastitis.
3. Persistent retraction of nipple in after life is sometimes due to previous infantile mastitis.
4. Evidence has been given showing that hypertrophy of the male breast is stimulated by the hormones which in the government of growth and development are antagonistic to the internal secretion of the testes.
5. "Chronic interstitial mastitis" in the male is, as in the female, essentially an aberrant evolutionary and involuntary activity. It occurs later in life in the male than the female.
6. Paget's "eczema" and every variety of new growth of the female breast have been met with in the male.
7. Cancer of the breast in man is usually atrophic in character, but the prognosis is poor, because, as a rule, relief is sought even later in the disease than in the case of the female.

My thanks are due to the surgeons of the London Hospital for permission to make use of their cases, and to the Director and Assistant Director of the Pathological Institute for their assistance.

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ENCEPHALITIS LETHARGICA WITH DIPLOPIA AS AN EARLY SIGN.

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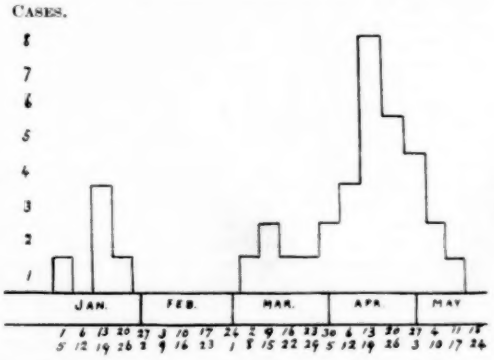
ABOUT April, 1924, there was an enormous increase in the number of patients who attended here complaining of diplopia. This is shown graphically in the figure in which there is recorded by the author, working in conjunction with Dr. L. H. Savin, the number of cases presenting themselves with diplopia every week of this year.

This sudden increase was due to the epidemic of encephalitis lethargica, of which we have had 21 undoubted cases; while we have also seen 19 cases of diplopia due to other causes. In nine of our cases there was a history of a previous febrile attack. Usually the patient "knew he had influenza, so did not trouble to call the doctor." But the diplopia soon made the patient realise there was something



wrong. With this diplopia was usually associated headache. At first (12 in 21 cases) they could not sleep; but after a few days drowsiness, with difficulty in opening the eyes, asthenia, and lethargy set in. After a time in many cases the diplopia ceased and the symptoms improved, but this was not invariable. A summary of these symptoms is given in the table.

Illustrative Cases.

CASE 3.—M. G., female. Had "influenza" about March 11th, 1924; this left her weak. Other members of the house also had "flu" about this time. On April 13th she felt "seedy" and began to see two of everything; this lasted only for half an hour. On the following day she got worse and "double vision" came on again and this lasted for five days. At the time she had headaches and felt very weak and drowsy. No overcrowding or gastro-intestinal disturbance. Eyes: Pupils react to light and accommodation, lateral diplopia; paresis of external rectus. When seen on May 14th she still felt weak and drowsy but had no diplopia. Her doctor reports that she made an uninterrupted recovery.

CASE 6.—W. C., male, aged 47. No definite influenza, but had "severe cold" in chest. First had malaria in 1916 and ever since has had frequent relapses of rigors and fevers, the last attack being on April 25th. A good sleeper as a rule, but had two sleepless nights previous to April 29th, on the morning of which, whilst going to work, he saw "two buses" when there was only one. He had headaches, felt weak, and began to sleep for 12 hours at a time; and still felt sleepy in spite of the rest he had. Tendency to constipation but no gastro-intestinal disturbances. No genito-urinary disturbance. Family, food, and housing accommodation negative. Eyes: Left ptosis with vertical diplopia. Visual acuity not affected. During admission he ran an intermittent temperature, which rose to 101° F. He was somewhat lethargic and placid. Blood examination showed no malarial or other organisms. He has made an uneventful recovery.

CASE 17.—W. H. N., aged 41, was an energetic man. At the end of March he began to see double, while convalescent from an accident in which he fell off a ladder.

He had nearly recovered from the accident when double vision began. At first he could not sleep, but now he is very drowsy and weak, the "antithesis of his former self, as all this laziness is foreign to him." The double vision lasted two weeks. Diplopia is now only elicited with difficulty. No fever at time of examination. Knee-jerks and ankle-jerks brisk. Left extensor plantar reflex was found.

CASE 19.—J. E. P., male, aged 29. On April 17th he felt "out of sorts with no appetite and lack of sleep." On the same day a severe headache began, and he had pains above the navel and in one elbow. Two days after he began to see "double" and was admitted into hospital. The temperature was 100·2° F. He had bilateral ptosis, vacant expression, and paresis of left external rectus. His right grip was weak. On the following morning he seemed disorientated and wished to know why he had been kept in hospital eight days. On dressing himself he laced up his boots and found he had forgotten to put on his socks. Wassermann was negative both in blood and cerebro-spinal fluid; a cell count of latter gave 68 lymphocytes and four red blood cells per c.mm. Tendon and superficial reflexes normal. He was transferred to a general hospital. The right optic disc was congested.

CASE 20.—E. B., boy, 5 years and 7 months. "Usually a demon." Previous illnesses whooping-cough, measles, followed by congestion of lungs. On April 9th he went to bed as usual about 7 P.M. Next morning got up cross-eyed and kept opening and shutting alternate eyes, though he made no direct complaint of diplopia. He had a headache, seemed drowsy, and did not want to go to school, which was unusual. Next morning (11th) he went back to bed himself after breakfast and slept all day, except when roused for meals, and all that night. Though next day he was awake for a time in the morning, he dropped to sleep during his dinner and dosed the rest of the day. This continued till April 20th, and while the other children played he lay on the grass and slept. On the 22nd he was brought to this hospital and slept while waiting his turn for examination. His temperature was 99·6° F. Admitted to hospital he slept the whole time except when roused, when he seemed quite intelligent. Wassermann negative. He described no diplopia, but there was a definite paresis of the right external rectus and right side of the face. The right hand grip was equal to the left, and he stated he used either hand indiscriminately "when he smacked his small sister." There were no other physical signs. Transferred to a general hospital he is now well on the way to recovery.

CASE 21.—E. G., female, aged 23, usually a "lively girl"; began to see double five days after an attack of "influenza" which she treated herself. On April 12th a friend went with her for a walk and she seemed "mopy," and on the way home "her eye went into the corner and she saw double." Two days later she came to hospital with weakness of both external recti causing diplopia on looking downwards and into the distance. She had severe headache and at first could not sleep. She then became drowsy and weak, and her friend states that when he calls she is always moping about, with her head on her hands, and will sit quiet for hours.

We have not attempted to split our series into various groups as suggested by American authors. For instance, they lay stress on a "mask-like face" as a sign of one type of the disease. Certainly many cases have an expressionless appearance, but we do not lay much stress on this point. In the course of a walk down Blackfriars-road we met 226 people, of whom 57 might be fairly said to have "mask-like faces," and yet the proportion was pulled down by a number of children just out of school.

SUMMARY OF SYMPTOMS IN PATIENTS COMPLAINING OF DIPLOPIA

Case No.	Sex.	Age.	Diplopia.	Fever	Headache.	Wakefulness.	Drowsiness.	Lethargy.	Asthenia.	Mask face.	Ptosis.	Pupils.	Eye muscles.	Wassermann.	Cerebro-spinal.	Food poisoning.	Overcrowding. Rooms.	Overcrowding. Persons.	Influenza.	Various.
1	F.	52	+	+	+	+	+	−	−	−	−	No acc. Sluggish.	S.R.I.O.	−	−	0	−	−	−	−
2	M.	26	+	+	+	+	+	+	−	+	−	−	−	−	−	0	−	−	−	Tonsillitis.
3	F.	28	+	−	?	−	+	+	−	−	−	−	R.E.R. L.E.R.	−	−	0	7	7	+	−
4	F.	53	+	−	+	+	+	+	−	−	−	−	L.S.O.	−	−	0	3	5	+	−
5	M.	30	+	−	+	−	+	+	+	−	−	−	R.E.R.	−	−	0	1	4	+	Mucus in phar. Pains in limbs.
6	M.	47	+	+	+	+	+	+	+	+	+	−	Vertical.	−	N.	0	7	4	+	Malaria.
7	F.	47	+	−	?	−	+	+	−	−	−	−	R.E.R.	Neg.	−	0	7	2	−	−
8	M.	66	+	−	−	−	+	+	−	−	−	No react.	Vertical.	−	−	−	−	−	−	Vomiting.
9	F.	60	+	−	+	+	−	−	−	−	−	−	R.E.R.	−	−	0	6	3	+	Photophobia.
10	F.	22	+	−	+	−	+	+	−	−	−	−	−	−	−	0	−	−	+	−
11	M.	16	+	−	−	−	+	−	−	−	−	−	E.R.	−	−	−	−	−	+	−
12	M.	30	+	−	+	−	−	−	−	−	−	−	L.E.R. depress.	−	−	0	5	3	+	−
13	F.	17	+	+	+	−	−	+	+	−	−	−	L.E.R.	−	−	−	−	−	−	−
14	M.	50	+	+	+	+	+	−	+	−	−	−	L.E.R.	−	−	0	3	10	+	−
15	M.	37	+	−	−	−	+	−	−	−	−	No react.	R.E.R.	−	−	−	−	−	−	Nystagmus.
16	M.	52	+	−	−	+	+	−	+	−	+	−	R.I.R.	+	−	0	2	5	+	−
17	M.	41	+	−	−	+	+	+	+	−	−	−	−	−	−	0	−	−	−	Weakness in legs. Babinski.
18	F.	28	+	+	+	+	−	−	−	−	−	−	−	−	−	−	−	−	−	Retinitis pigmentosa.
19	M.	39	+	+	+	+	+	+	+	+	+	−	L.E.R.	Neg.	Lympho-cytes.	−	−	−	−	Congestion optic disc.
20	M.	5	+	+	+	+	+	+	+	−	−	−	R.E.R.	Neg.	−	−	−	−	−	Thirst.
21	F.	23	+	−	+	+	+	+	+	−	−	−	R.E.R. L.E.R.	−	−	0	8	8	+	−

The average age of our cases works out at 37 years. The disease affects males and females as 4 to 3 in our series. Our patients were not confined to any one occupation, but included clerks, housewives, bricklayers, domestics, shop-people, &c. From what we were told we are convinced that overcrowding played no important part in causation of this disease.

Eye Symptoms and Signs.—In every one of our recorded cases there was a definite history of double vision. This usually was sudden in onset and formed the prominent and early symptom of which complaint was made. This diplopia was in a good many cases associated with headaches, and was of a transient nature, lasting about one to four weeks in the mild, and for longer periods in the more severe instances. In several cases the diplopia was intermittent. The external recti were affected in 60 per cent. of the cases. In these it was usually a paresis, but in two cases from previous years (Cases 8 and 11) we have to record permanent paralysis. The vertical muscles were affected to a lesser extent and were usually combined with ptosis. Many complained of inability to keep the eyes open. Definite ptosis was recorded in three cases and was transient. No true nystagmus was recorded except in one case. We did not note any gross change in the pupils. In some cases the pupil of one side was more sluggish in its reaction to light. Only in one case was the accommodation paralysed. No fundus changes were found except in one acute case (Case 19) where we thought the right optic disc showed congestion.

General Symptoms.—In two-thirds of our cases there was severe headache associated with or preceded by diplopia. There was often a slight rise in temperature, and we think from the history fever is always present in the early stages of the disease. Wakefulness was an early sign and frequently preceded the onset of lethargy, asthenia, and drowsiness, which were almost invariably present. Even the most somnolent patient could be temporarily roused to pay some attention. Constipation, though present in some cases, was not a prominent symptom. The genito-urinary system was unaffected.

Diagnosis.—We have based our diagnosis on the clear clinical picture of diplopia, headache, fever, and wakefulness, followed by drowsiness, asthenia, and lethargy. The cerebro-spinal fluid was examined in a few cases but nothing pathognomonic was found. The Wassermann reaction is of value where the question of a syphilitic infection arises; but syphilitics are not immune to encephalitis lethargica (Case 16). Until some specific test is found we can rely very little on the laboratory except for negative diagnosis.

Relation to Influenza.—Several patients gave a definite history of previous "influenza," usually two or three weeks before the onset of diplopia. In one case all the other members of the house had "influenza" at the time and yet she was the only one to develop encephalitis lethargica. If the disease were contagious we should expect several cases in the same house, and this so far has not occurred.

Relation to Food and Botulism.—The majority of our patients were well nourished. In none of our cases were we able to assign any particular type of food as a cause in the onset of the disease. There were no gastro-intestinal disturbances.

Treatment.—Those cases which came under our direct supervision we treated with urotropine, iodides, and salicylates. We had very encouraging results; and in the absence of any specific remedy we think these drugs ought to be used more extensively. As purgatives we recommend calomel followed by salines.

Conclusions.

The series shows the type of case likely to attend an eye hospital. In view of the 100 per cent. of diplopia in our series we would urge that encephalitis lethargica should be borne in mind by the practitioner in every case of "double vision" encountered. Several of our patients first consulted their doctors for diplopia, but the real nature of the disease was not suspected. The present epidemic shows many mild and ambulatory cases, which are easily overlooked unless a systematic inquiry is made into the history.

We are much indebted to Mr. A. D. Griffith, Mr. T. W. Letchworth, Mr. E. A. Dorrell, Mr. W. J. Lindsay, and Mr. H. W. Beedham for permission to examine and report the foregoing cases.

THE INTRAVENOUS INJECTION OF ANTITOXIN IN DIPHTHERIA.

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IN an article [1] published in THE LANCET last spring, Dr. Poul Iversen, of Copenhagen, strongly advocated the intravenous route for the injection of antitoxin in diphtheria. This aroused considerable discussion, from which it appeared that the intravenous method had been tried by various authorities in this country, but the results were not regarded as sufficiently striking to warrant its employment except in very severe cases. Subcutaneous and intramuscular injections are the methods mainly employed in this country. The latter has now become the routine mode of administration in most fever hospitals, but in general practice the subcutaneous route is still most commonly used. As the three methods are being practised to varying extents it may be of interest to give an account of our experience at Plaistow Hospital, especially of the intravenous route.

Subcutaneous Injection.

This was the method generally used in the early days of antitoxin treatment, and it continued to be the routine method at Plaistow until the year 1913. Its advantages as regards safety, simplicity, and average results, are so well known as to require no comment. It has one disadvantage, however, the importance of which may not be so fully realised, and that is the slow rate of absorption of the antitoxin from the subcutaneous tissues. It was pointed out recently by Prof. Madsen [2] that the absorption of antitoxic serum follows laws which are quite different from those applicable to crystalloids such as morphine, &c., where the effect is obtained in a few minutes. Experiments have shown that nearly three days elapse before the maximum concentration of antitoxin is obtained in the blood after a subcutaneous injection, also the total quantity present is only one-third of that obtained immediately by an intravenous injection. It can be seen, therefore, that this constitutes a very important disadvantage, especially in a severe late case of diphtheria. Subcutaneous injection has ceased to be employed for routine work at Plaistow, and is now only used very occasionally in giving a desensitising dose to a patient who has had serum before.

Intramuscular Injection.

This method was first used at Plaistow in 1913, and the results proved so satisfactory that it soon completely displaced subcutaneous injections for routine work. Its advantages over that method are very definite, the most important being the much more rapid absorption of the antitoxin. Experiments have shown that this is about three times as rapid and that the difference is very noticeable in the first ten hours, which is often a critical period for the patient. The method is as safe as the subcutaneous, and the technique quite as simple. The site chosen for the injection is the outer region of the thigh. There is no danger of injuring any important structures in this area, and a dose of 12,000 units can be given quite easily. Also the injection itself is less painful in this region than in some other parts of the body. It is the method now used at Plaistow for all mild and moderate cases of diphtheria.

Intravenous Injection.

In 1903, after a very favourable report had been published by D. L. Cairns [3] on 20 cases of diphtheria treated by intravenous injection at Glasgow, Biernacki and Muir [4] tried the method at Plaistow on 45 selected grave cases. Their conclusions were very conservative, but, on the whole, suggested that the method had some value as against other modes of administration. The trial was continued during the next two years, when a further report was published by A. O. Bisson [5] on 200 cases. In the cases treated by Biernacki and Muir the injections were given by incision under a general anæsthetic, but this was afterwards discontinued, and in most of Bisson's cases direct puncture was employed without an anæsthetic. Bisson emphasised the severe reaction which occurred in some cases after the injections, but he did not express any opinion on the value of the treatment, and apparently the results were not regarded as very satisfactory, for the method was discontinued shortly afterwards.

In 1921 the writers started to give the intravenous route another trial, and the results have been so encouraging that it is now used regularly for all severe cases. During the past two years 125 cases received intravenous antitoxin, and the following details are given of the treatment and our results.

Type of Case.—The intravenous injections have been given only to toxic cases, mostly of the naso-pharyngeal

type, with extensive membrane on the fauces, enlargement of the cervical glands, and discharge from the nose. These cases were selected on account of their severity from 1025 diphtheria cases which came under treatment during the past two years. Within the last six months we have used the method also in laryngeal cases and the results have been encouraging. Sixteen laryngeal cases are included in this series. All the cases were late in coming under treatment. Table I. shows the duration of the illness on admission according to the history given by the relatives.

TABLE I.—*Duration of Illness on Admission.*

Days.	Cases.	Days.	Cases.
Two	12	Five	22
Three	32	Six and over	15
Four	44		
		Total ..	125

Dosage.—In most cases only the first dose was given intravenously, and was followed by intramuscular injections. The intravenous dose varied from 6000 to 40,000 units, the average being 18,000 units. The largest amount given at a single injection was 24,000 units. Eleven cases had all the serum intravenously in one or two injections; the rest had the initial dose only intravenously followed by intramuscular injections. The total amount of serum given to all cases of the series varied from 12,000 to 100,000 units, the average being 48,000 units.

The following two cases are quoted from the series as typical examples of the type of case selected for intravenous injection, and also showing the amount of serum given.

CASE 1.—A female patient, aged 8 years, was admitted on June 5th, 1923, on what was stated to be the fifth day of illness. Her tonsils were greatly enlarged and covered with thick greyish membrane extending on to the soft palate and uvula and the back of the pharynx. Both sides of the neck were very swollen and there was profuse discharge from the nose. The odour of the breath was markedly diphtheritic. There was a heavy cloud of albumin in the urine. The temperature was 100·6° F.; the pulse 124 and of low tension. On admission the patient received 20,000 units of antitoxin intravenously, and this was followed by three intramuscular injections at intervals of 12 hours, the total amount given being 70,000 units. No reaction followed the intravenous injection. On June 6th the nasal discharge had ceased, the glandular swelling had subsided, and the membrane was beginning to break up. On June 24th palatal paralysis set in and the knee-jerks were absent. A fortnight later ciliary paralysis developed. There was no serum sickness. By August 7th the nasal voice had cleared up and the vision was normal, but the patient had a marked diphtheritic gait. She continued to make good progress, and was discharged on the ninety-eighth day of her illness.

CASE 2.—A male patient, aged 4½ years, was admitted at 3 P.M. on Feb. 15th, 1923, the fourth day of his illness. Both his tonsils were completely covered with typical false membrane which extended to the soft palate and uvula. The glands at the angles of the jaw were much enlarged, and there was discharge from the nose. The patient also had a croupy cough. The temperature was 101° and the pulse 128. The urine contained a trace of albumin. At 4 P.M. 24,000 units of antitoxin were injected intravenously. About 40 minutes later a reaction of moderate severity set in, lasting for about 20 minutes. The temperature rose to 104° and the patient had a rigor. The laryngeal symptoms were aggravated during this time, but subsided as the reaction passed off. Two intramuscular injections were given at 12-hour intervals, making a total dose of 50,000 units. On the 17th the nasal discharge had ceased, the laryngeal symptoms subsided, and the membrane was breaking up. On the 19th the patient vomited and the pulse was soft and irregular. By the 22nd, however, the circulatory condition had improved, and from this time the patient made an uneventful recovery. There was no serum sickness and no paralysis. He was discharged from hospital on the sixty-fourth day of his illness.

Technique.—The injections have been given by direct puncture, usually into the veins of the arm at the bend of the elbow. In two cases of the series the external jugular was used. In no case has a cutting operation been performed or a general anæsthetic given. The arm is surgically cleaned at the elbow and held by a nurse well extended over the side of the bed or cot. The nurse exerts manual compression by grasping the arm tightly at the middle of the humerus with one hand while the other hand controls the wrist. No other form of tourniquet has been found necessary. The injection is made with an ordinary antitoxin syringe, care being taken that the serum has been warmed to body temperature. The puncture wound is afterwards sealed with a collodion dressing. The whole procedure is quite simple and comparatively painless, and after some experience there is little difficulty in making the injection, even in children of 2 and 3 years. The ages of the cases in the present series are shown in Table II.

TABLE II.—*Intravenous Cases Classified According to Age.*

Years.	Cases.	Years.	Cases.
0–1	1	10–11	12
1–2	2	11–12	5
2–3	5	12–13	3
3–4	9	13–14	6
4–5	18	14–15	3
5–6	19	15–20	8
6–7	13	Over 20	2
7–8	8		
8–9	7		
9–10	4	Total ..	125

Reaction.—In the majority of our cases a definite reaction set in about 40 minutes after the injection. Its onset was usually sudden with chilliness, which soon developed into a rigor. Pyrexia was a marked feature; the temperature often rose to 104° or 105°, and in a few cases it reached 106°. The pulse was often small and rapid and the respirations quickened. In a few instances the patient was slightly cyanosed at the height of the rigor. Vomiting occurred on seven occasions, and in one case a profuse urticarial rash appeared during the reaction and remained for half and hour. No reaction occurred in 24 cases. The severity of the reaction did not appear to bear any relation to the amount of serum injected. A dose of 6000 units caused a more severe reaction in some cases than 20,000 units did in others. On the other hand, there seemed to be a distinct connexion between the sharpness of the reaction and the severity of the case. Very toxic cases often had no reaction at all, or it was only slight. This feature has been so pronounced in our cases that we have been led to regard a definite reaction as a favourable sign, indicating a good resistance on the part of the patient. Two brands of serum have been used lately, one concentrated, the other unconcentrated. They were obtained from different makers. No difference could be detected in the antitoxic value of these two serums, nor was there any marked difference in the severity of the reaction caused by them.

Although the reaction was severe in some cases the symptoms could not be described as very alarming. When a sharp rigor set in warmth was applied to the patient by means of extra blankets and hot-water bottles; sometimes a hypodermic injection of 5 minims of camphor was given and occasionally, if the patient's colour was poor, inhalations of oxygen were given for a few minutes. The symptoms usually passed off completely after about 20 minutes, and the patient fell into a peaceful sleep. Recently, however, one case has come under our care where death occurred six hours after the intravenous injection. This was a boy, aged 10 years, who was admitted at 11 P.M. on August 26th. He was in the third day of illness and suffering from a severe attack of diphtheria. 18,000 units of antitoxin were injected intravenously and 10,000 intramuscularly about half an hour after admission. Forty-five minutes later he developed a severe rigor; the temperature rose to 107° F., the colour and pulse were poor, and he vomited. After 20 minutes the rigor passed off and the patient went to sleep. Within half an hour, however, the breathing became very stertorous and he was found to be unconscious. The pupils were widely dilated, the pulse imperceptible at the wrist; cyanosis was marked and the temperature had risen to 108° F. After about 15 minutes the breathing became quieter and the colour and pulse improved, but the patient never regained consciousness. Paroxysms of dyspnœa,

lasting about 15 minutes, recurred at frequent intervals, and gradually tonic spasms set in. The patient died in a convulsion six and a half hours after admission. At the autopsy the thymus gland was found much enlarged and the lymphoid tissue throughout the body greatly hypertrophied. The post-mortem findings pointed to a condition of status lymphaticus. There was no indication on admission that an intravenous injection in this case might be followed by any untoward results, and we could only ascribe the fatal issue to the status lymphaticus found post mortem.

In Table III. the reactions have been classified according to severity.

TABLE III.

No reaction	24 cases.
Mild reaction	22 ,,
Moderate reaction	52 ,,
Severe reaction	27 ,,
Total	125

In the cases classed under Mild Reaction, the symptoms were a rise in temperature, not exceeding 102°, and a slight increase in pulse-rate, but no rigor. Under Moderate Reaction were classed cases with a rise in temperature over 102° but not exceeding 104°, an increase in pulse-rate and a mild rigor lasting about ten minutes. Under Severe Reaction the symptoms were a rise in temperature of 104° and over, a small rapid pulse, a marked rigor lasting for 20 minutes, and vomiting in some cases.

Serum Sickness.—Of the 125 cases injected intravenously, 58, or 46·4 per cent., had serum sickness. The rash appeared at periods varying from 3 to 14 days, the average being nine days. Three of these had had serum previously, and in each of them a severe rash occurred three days after the injection. In comparing the serum sickness among these intravenous cases with that which occurred during the same period among 900 other patients who had intramuscular injections only, no appreciable difference was found either in the date of onset or the severity of the sickness.

Results.

Fatal cases: 15 deaths occurred among the 125 intravenous cases. This gives a fatality-rate of 12 per cent. As these cases were selected on account of their severity from a total of 1025 cases which have been under treatment during the past two years, this mortality figure is not regarded as unsatisfactory. The following case is quoted from the 15 deaths as a typical example of the fatal cases.

CASE 3.—A female patient, aged 6 years, was admitted on Sept. 24th, 1922, on what was stated to be the fourth day of illness. Both her tonsils were much swollen and were covered with thick greyish membrane which extended on to the uvula and a portion of the soft palate. Nasal discharge was profuse and both sides of the neck were much swollen. The patient looked very toxic. The temperature was 100°, the pulse 120 and of low tension; 18,000 units of antitoxin were injected intravenously on admission, and this was followed by four intramuscular injections. The total amount of serum given was 62,000 units. A mild reaction followed the intravenous injection, the temperature rising to 102°. On the day after admission the nasal discharge was blood-stained, and ecchymoses were present round the sites of antitoxin injection. The urine became very scanty and was loaded with albumin. Vomiting began two days later, and the pulse became almost imperceptible at the wrist. Death occurred on Sept. 28th, four days after admission and the eighth day of illness.

Among the 900 cases which had been treated by intramuscular injections during the same period there were 46 deaths, a fatality-rate of 5·17 per cent. This includes 20 cases which died from laryngeal involvement. The total fatality-rate among the 1025 cases, which includes the 125 intravenous cases, has been 5·95 per cent.

Paralysis.

Thirty-two of the 125 intravenous cases had diphtheritic paralysis. This gives an incidence-rate of 25·6 per cent. The paralysis was mild in 15 of these cases and severe in 17. Among the 900 cases treated intramuscularly 45 had paralysis, an incidence-rate of 5 per cent. In 30 of these the paralysis was of a mild type and severe in the remaining 15. Altogether there were 77 cases of paralysis among the total 1025 cases, giving an incidence-rate of 7·5 per cent. The higher paralysis-rate among the 125 intravenous cases can be accounted for by the severity of the disease in these cases.

Conclusions.

Our experience during the past two years has convinced us that the intravenous injection of antitoxin is of great value in severe cases of diphtheria. The toxic symptoms subside much more rapidly than after an intramuscular or subcutaneous injection. The onset of paralysis also appears to be diminished. We were impressed by the number of cases in the above series which escaped paralysis. On the other hand, we do not advocate giving antitoxin intravenously to mild and moderate cases, where intramuscular injections have proved sufficient. As the reaction which usually follows an intravenous injection is sometimes very severe it seems unnecessary to expose moderate cases to the discomfort and even risk of such a reaction. For this reason we have only used the intravenous route in severe cases where there has been a definite risk of the disease proving fatal. The injection itself is simple and comparatively painless and it can be performed in young children.

References.

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2. Madsen, Th.: Journal of State Medicine, 1923, i., 101.
3. Cairns, D. L.: THE LANCET, 1902, ii., 1685.
4. Biernacki, J., and Muir, J. C.: Ibid., 1904, ii., 1774.
5. Bisson, A. O.: Ibid., 1906, ii., 929.

Corrigendum.—Prof. H. M. Turnbull writes that the final sentence in his pathological report to Dr. A. W. M. Ellis's paper on Hyperglycæmia in Acromegaly (THE LANCET, June 14th, p. 1203) should run: "It can be called 'a mixture of neuroblastoma and embryonic neuroma.'"

Medical Societies.

LONDON DERMATOLOGICAL SOCIETY.

OCCUPATIONAL DERMATOSES.

ON June 11th Prof. MORITZ OPPENHEIM, of Vienna, delivered the annual oration of the Society at the Hospital for Skin Diseases, Leicester-square, on Affections of the Skin caused by Occupation and Profession. There was a goodly attendance, and the distinguished professor was introduced by Dr. J. M. BUNCH, President.

Dr. Oppenheim commenced by naming many well-known workers in this division of skin disease in various countries, including Adamson, Lett, MacLeod, and Sequeira. He said it had been computed that between 20 and 30 per cent. of all skin cases belonged to the occupational category. In these, cauterisations of the skin due to employment came first in frequency, followed by eczematoid conditions, while at the bottom of the list were the impetigoes. Burns and cauterisations of the skin might be due to electricity, to X rays, to radium, to acids. It was necessary to distinguish between a natural delicacy or susceptibility of skin and the action of irritants on the skin. The normal predisposition of the skin to react to these agencies and show lesions might be either heightened or diminished, therefore there was a distinct pathological susceptibility, and this might be either congenital or acquired. Congenital predisposition, in certain respects, was met with in the case of the brunette and the blonde. Various types of body had also to be taken into consideration, for both body and skin, in fact the whole system, must come into review. In the case of such congenital skin diseases as seborrhœa, ichthyosis, and psoriasis there was seen to be a constitutional predisposition to respond to irritation.

The irritations which attacked the skin were of complicated nature. He had experimented with such

an apparently simple substance as vaseline. Sometimes it caused hyperkeratosis, at other times impetigo, at still others hyper-pigmentation. When it produced hyperkeratosis there was in the vaseline an excess of paraffin, and when hyper-pigmentation resulted there was an excess of colloid bodies. He showed the slide of an artificially produced vaselinodermia on the face of a child on which vaseline had been applied. There were to be seen many hyperkeratotic papules. In another case in which vaseline had been applied there was a dermatitis, with swollen eyelids and impetigo, due to the colloidal constituent, and probably also aided by bacteria.

The stigmata of occupational dermatoses were mostly transitory. He showed pictures, mostly in colour, of the hands of a dyer, showing a yellow staining, of a carpenter whose hands were stained with sulphuric acid, of a tinker whose hands had numerous fissures and callosities following the use of the tools of his trade. A shoemaker showed extensive lichen spinulosus on the chest due to the use of pitch at his work, known as a lower degree of "pitch skin." A miller showed a dark tattooing on the wrist caused by the impact of hot pieces of steel from the chisel when it was being sharpened on a grindstone; this stigma endured for a much longer time than most. Chronic cauterisations, resulting often in ulcers, were very frequent; they were caused mostly by lime, sulphuric acid, chromic acid, arsenic, &c. The skin changes caused by the passage of a strong electric current were due to the impregnation by the current of minute dust and metal particles. The condition known as chronic Rontgen dermatitis sometimes led to cancer. Soot, dust, and some powders caused an inflammation of follicles by obstructing them. Also, there were sweat gland affections, comedosis, and abscesses due to infection with staphylococci, the latter occurring in sebaceous glands, too. Benign skin affections, such as papillomata, were caused by petroleum, Rontgen rays, aniline dyes, &c. An arsenic burn on the foot was surrounded by a halo of inflammation. A typical burn produced by explosion of benzine was also shown. The man was working with his shirt open at the chest when the explosion took place, and the chest was covered by the burn. A man burned in a munition factory by an explosion of gunpowder had sordes-like lesions on the lips and much tattooing on the face. A galvaniser had acute nitric acid cauterisation on the back of the hand; there were yellow sores surrounded by irregular haloes, and in certain parts there were blisters. A tanner showed acute cauterisation ulcers on the wrist and chronic ulcers on the tips of the fingers. Other ulcerations shown were produced, respectively, by potassium, ammonia, and sulphuric acid; in some instances there were pre-ulceration blisters. Trench-foot of the second and third degrees was also depicted: there was a huge bullous affection of both feet, and a great degree of disfigurement. Amputation was necessary. Sulphuric and oxalic acid burns showed a black and deep ulceration, and it was necessary for such patients to remain from work for a long period. A skin change shown resulted from the passage of a current of 110 volts. Metal-dust impregnation, chiefly copper, produced a very enduring stigma; the tattooing was mostly in the deeper layers of tissue. The wire conveying current of very high power touched a man's body and produced a deep groove in the tissue beneath the shoulder, with radiating lines of cauterisation in the near neighbourhood. The man died from the shock. Radium burns produced a charring with crater-like ulcerations. The man had had radium applied for psoriasis vulgaris. A man with folliculitis of forearm conveyed it to his genitalia by contact. Pitch caused comedone formation and folliculitis, with acne scars and sycosis-like confluent lesions, with hyper-pigmentation. A paraffin worker developed a benign tumour in the scrotum, and an arsenic worker exhibited a cancer-like growth. Onychomycosis was found in bakers, and certain substances handled in the course of occupations caused a falling out of hair and a hyperkeratosis. Toxidermias, dermatitis circumscripta, and eczema resulted from a sensitive condition of the skin; there was a suitable medium for the entrance of chemical irritants; there might be an acute and generalised affection of blood-vessels. In eczema there was a change in the reaction. Photographers suffered from nail affections due to the use of silver lotion. Among the illustrations of toxidermia was one of the head of a gardener who had swollen eyelids, forehead, and nose following irritation of a box-wood tree, and the hand of a carpenter whose poison was the resin of satin-wood. One case had desquamation of the skin of the face following the use of jute; another had dermatitis circumscripta following work in a boot-polish factory, and a petroleum worker showed the same condition. A galvaniser exhibited desquamation, redness, and superficial sores in the folds of the skin. Healing took place after ceasing work for eight days, in which respect it was in striking contrast with eczema.

ROYAL ACADEMY OF MEDICINE IN IRELAND.

A MEETING of the Section of Medicine was held on May 30th, Dr. T. G. MOORHEAD, the President, being in the chair.

Dr. L. ABRAHAMSON read a paper on three cases of

Epidemic Encephalitis with Painful Myoclonus.

The first case was that of a male, aged 11, who was admitted to hospital on March 13th last in an unconscious condition, with pupils sluggish and eyeballs oscillating slowly from side to side. Examination of the abdomen showed sharp spasms of the upper recti at a rate of about 60 per minute. The spasms were not completely rhythmical. Tendon reflexes and abdominal reflexes were absent. Lumbar puncture yielded a clear fluid with lymphocytosis. On the day of admission the patient developed an epileptiform attack: two days later slight strabismus was marked on the right side. On this day consciousness returned and complaint was made of abdominal pain. This subsided after two days and intense pruritus appeared which lasted for a fortnight. The abdominal spasms continued without remission. Pyrexia was slight and remittent. The patient was discharged from hospital on May 15th; spasms were still present in the recti and external oblique muscles.

The second patient, aged 19, was admitted to hospital on March 23rd complaining of severe abdominal pain. Examination of the abdomen showed the presence of sharp, but not completely rhythmical contractions of the muscles at the rate of about 70 per minute. The muscles involved were the recti and the right external oblique. The contractions were very forcible and were associated with intense pain. Temperature 99° F., pulse 102, respirations 26 per minute. The pain increased and the abdominal contractions were so forcible that the bedclothes were lifted with each spasm. Lumbar puncture yielded a clear fluid under increased pressure. Later the pain became agonising, the contractions spread to other groups of muscles and were so violent that they shook the bed. After some days the spasms and the pain subsided and delirium set in. The delirium was of the "occupational" type. The patient was noisy, restless, and at times difficult to control. Severe pruritus occurred and it was found necessary to bandage the hands. Transient ptosis was observed on April 2nd. Delirium gave way to unconsciousness and coma. The patient died 17 days after admission. A post-mortem was performed by Dr. E. C. Smith. The naked-eye appearances consisted of small hæmorrhages into the meninges. The vessels of both the brain and cord were injected and some of them were thrombosed. In sections, minute hæmorrhages were seen in the cortex, the pons, medulla, cerebellum, and cervical region of the cord. Perivascular infiltrations were found which

consisted of lymphocytes with occasional plasma cells, arranged in a halo-like manner round the vessels. The changes were most marked in the region of the optic thalamus, pons, the island of Reil, and the cervical region of the cord. Hæmorrhages were found in the heart, spleen, kidney, and liver. Numerous groups of plasma cells were found in the spleen.

The third case was that of a male, aged 57, who was admitted to a nursing home on May 18th complaining of pain in the back of the neck and of insomnia which had lasted for three days. Examination showed spasms of the right upper rectus, right trapezius, and right erector spinæ muscle. These spasms occurred at a rate of 16–20 per minute and were irregular both in strength and in time. Spasms continued and spread to other groups of muscles. Pain was intense and insomnia complete until the 20th, when the patient slept for some hours. After this spasms and pain were absent for some days, but delirium of the occupational type set in. At times control was necessary. On the 25th spasms reappeared in various groups of muscles, delirium became continuous, and severe pruritus was noted. Ptosis of the right eyelid was noted. Some days later unconsciousness set in, the breathing became stertorous, the sphincters relaxed. Picking at the bed-clothes was continuous. On the 29th the patient died. The temperature chart showed a remittent form reaching 102·6° F. on the day of death.

Dr. Abrahamson stated that of 12 cases of encephalitis seen by him recently, seven had belonged to this type. He dealt with the question of nomenclature and suggested that "encephalitis multiformis" would be a more appropriate title than any of the names suggested hitherto.

Discussion.

Dr. R. J. ROWLETTE said that at Mercer's Hospital during the last couple of months there had been five cases of encephalitis, and the difference in symptomatology between these cases and cases of the disease which he had seen in 1918 and 1919 was striking. At that time lethargy had been the most striking feature about the cases, but now there was myoclonus, alternating with lethargy and delirium. The lethargy varied very much, as sometimes it was very slight and the patient could be roused, and at other times the patients went from a lethargic state into a state of coma, from which they could not be aroused. He had noticed that when the patients were aroused they were quite alert and could answer questions intelligently, but they only remained like that for a very short time, and soon became delirious again. The muscle most commonly affected with myoclonus was the rectus abdominis, and the left rectus abdominis was usually more affected than the right. It was, of course, noticeable in other muscles too. The type of encephalitis now seen was an active type, whereas in 1918 and 1919 it had been a more passive type. He thought that the difference in the symptomatology of the disease could be regarded as being due to the different parts of the central nervous system which were affected. It had to be remembered that one was dealing with an infection which might attack any part of the nervous system. It had been suggested that the disease was a manifestation of influenza, but he did not agree with this statement. There had been cases of encephalitis in other countries before the influenza epidemic occurred, but it was, of course, possible that these cases were forerunners of the epidemic. It had also been suggested that the disease might be due to Pfeiffer's bacillus. If this was the case, it was curious that this bacillus was not separated readily from the lesions in the central nervous system. He was of opinion that so far there was no established connexion between any bacillus and this disease.

Dr. J. O'DONNELL drew attention to three typical cases of the disease which had come under his notice. One was that of a girl, who at first was choreic in type, but gradually passed into a lethargic state, with loss of vision. The second case was a man who had been lethargic from the beginning, and had had visual disturbance, accompanied by myoclonus, and now greatly resembled a case of peripheral neuritis. The third case was a male student, who at the beginning complained of generalised pains and defective vision. Acute mania set in, followed by delirium, and the patient got violent and had to be removed to an asylum, where he died after three days.

Dr. W. C. MACFETRIDGE drew attention to the fact that while none of the cases reported by Dr. Abrahamson had complained of eye symptoms, all Dr. O'Donnell's patients had suffered from defective vision, and that while some of the patients were lethargic, others suffered from insomnia. He agreed with Dr. Abrahamson that the name lethargica should be given up, as it was a misleading one. It would be interesting to know how the patients got on after they left hospital. He understood that some of them afterwards developed Parkinson's disease. He had seen one case in which the principal symptom had been loss of vision, but this particular case had made a complete recovery. It was apparently a disease the severity of which varied greatly, and although there were some fatal cases, he thought that there were a great many mild cases which got completely well.

Dr. W. G. HARVEY said he had recently seen a case of a little boy who was of the choreic type, and had a perfectly regular clonus on the rectal muscles of the thighs. Although the boy complained greatly of abdominal pain, Dr. Harvey had not been able to satisfy himself that this pain was due to clonus of the recti muscles. There was no marked rigidity of the abdomen. There was insomnia at first, but the patient soon became lethargic. It was interesting to note the difference in type of cases of this disease—some went through an irritative stage at the beginning, and gradually passed into a lethargic state, but most cases he had seen seemed to be lethargic from the beginning.

Dr. A. R. PARSONS asked if optic neuritis was ever found in cases of encephalitis, as in all the cases he had seen the fundus had been perfectly normal. The cases he had seen had had abdominal pain, but no myoclonus. In one case he had seen catalepsy, and this patient, after being unconscious for several days, recovered. Any cases he had seen in 1918 had been Parkinsonian in type, but all his cases lately had been delirious.

Dr. H. BEWLEY asked what the prognosis in cases of encephalitis was. He had seen a case three years ago, and although the patient recovered, for a year afterwards she was melancholy and stupid. He had lost sight of her since, so did not know whether this condition still persisted. This year he had seen a student who had apparently had an attack of acute mania, and he also had distinct diplopia. After about a fortnight this disappeared and the patient left hospital and was sent home. That was three months ago, and he had recently seen the patient again and his mind was not right, as he could not concentrate properly upon anything. It would be interesting to see whether this condition persisted, or whether the patient's mind gradually got normal. Having regard to these two cases, he would not like to give a prognosis of real recovery in acute cases of encephalitis.

Dr. C. PRESTON BALL asked how many of Dr. Abrahamson's cases had got well while in hospital, and how they got on when they left. He had recently seen a case of typical Parkinson's disease, and the patient said that he had not long left hospital after recovering from encephalitis.

Presidential Summing-up.

The PRESIDENT, in summing up, said that the discussion that evening had mainly centred on the great variety of symptoms presented by the disease, and on the apparent change of type since the disease had first become prevalent. He himself had only seen three myoclonic cases, through the kindness of Dr. Abrahamson, but he had seen a fair number of cases of the choreic type, and many with lethargic symptoms.

Regarding the ultimate prognosis, he was inclined to think that, on the whole, children were more likely to make a complete recovery than adults. At any rate, he knew of some children who had suffered from the disease in 1919 and who had remained in every way normal since then, while in most adult cases nervous disorders of one sort or another usually supervened. Concerning treatment, he thought all were agreed that symptomatic methods were alone of any use. He had himself given up lumbar puncture, except as an aid to diagnosis. The relationship of encephalitis to influenza was still sub judice, and he knew of no well-confirmed evidence that influenzal vaccines had had the least effect on the course of the disease.

DR. ABRAHAMSON, in replying, stated that of the 12 cases referred to by him, four had died. Treatment had been mainly symptomatic. Vaccine treatment was, in his opinion, empirical and useless. Four cases seen by him in consultation had been treated by a vaccine (antigen) of Pfeiffer's bacillus: of these two cases had succumbed. In one of his cases the patient developed hæmaturia, attributed by him to the use of large doses of hexamine. He referred to the occurrence of abortive cases. Lumbar puncture had not yielded much help. He agreed that the prognosis was better in children.

DR. PARSONS read notes of a case of Universal Herpes, which were discussed by DR. L. L. CASSIDY and DR. N. M. FALKINER.

DR. HARVEY read a note on 14 patients with Fur Dermatitis.

SCOTTISH SOCIETY OF ANÆSTHETISTS.

AT the annual meeting of this Society, held at the Royal College of Surgeons, Edinburgh, on May 17th, DR. H. P. FAIRLIE (Glasgow) opened by reading his presidential address on the subject of

Anæsthesia: its Present Position.

Dr. Fairlie introduced his subject with a consideration of the position and status of the anæsthetist. He said that while in London the administration of anæsthetics had been more or less in the hands of the specialist since the discovery of the anæsthetic properties of ether and chloroform, such names as Clover and Snow being sufficient reminders of this fact, in Scotland the specialist was of more recent origin. Until about 20 or 30 years ago the Scottish surgeon depended, to a considerable extent, for the anæsthesia of his patient on the assistant, house surgeon, or general practitioner in charge of the particular patient on whom he was operating. But with the amazing developments which had taken place in surgery during those years the demands on the administrator of anæsthetics had grown, and now the anæsthetist in Scotland could regard with satisfaction the improvement which had gradually taken place in his lot. No doubt, he said, there was still room for improvement in several directions as, for example, in the information vouchsafed to the anæsthetist in the booking of appointments. It was hardly justice to patient, surgeon, or anæsthetist to have the bare fact of an appointment at a certain time and place communicated, as there was a considerable difference in the methods required for anæsthetising, say, a whitlow, a cholecystitis, a goitre, and a cleft palate.

In consideration of the anæsthetics at present available, the speaker confined his remarks to those which were in more general use, and to the newer methods of administering them. On the old controversy on the respective merits of ether and chloroform he did not intend to say much. His choice of anæsthetic, whether ether, chloroform, or other drug, depended on the exigencies of the particular case. In connexion with chloroform he touched on three points. He did not agree with Flagg, who said in his recent edition of "The Art of Anæsthesia":

"In the author's experience, chloroform has completely given way to ether administered by intra-pharyngea methods. This condition holds with the single exception of oral cases in which the actual cautery is used."

If it was used, however, it should be done with very great circumspection, and, in the speaker's opinion, by some form of dosimetric apparatus which controlled the vapour strength. Further, chloroform should not be given at all in acute sepsis, particularly of the abdomen, because of the risk of acidosis, and finally it should not be used except by the expert. Adequate anæsthesia could be maintained, and anæsthetic mortality considerably reduced, by a more general employment of open ether in the hands of house surgeons and those who only occasionally gave anæsthetics.

With regard to ether, so many new methods and appliances had been introduced that it was almost impossible to keep up to date. The speaker considered the most valuable innovation in giving "open" ether was the perhalation method which Dr. A. Ogston described to the Society two years ago. A slight modification of it which he found most useful was to combine it with the bomb method of Wilson and Pinson, leading the tube from the bomb between the layers of gauze in Ogston's mask, and thus introducing warmed vapour instead of dropping liquid ether on to the gauze. In addition to the advantage which the warm vapour gave, there was also the freeing of the hand which was usually occupied with the drop-bottle. Shipway's apparatus for warmed chloroform and ether vapours he found invaluable in face, mouth, and nose operations, where a mask was inconvenient to the surgeon. Rectal anæsthesia, using Gwathmey's ether oil mixture, was of great service in laryngoscopic and bronchoscopic examinations. The intra-tracheal method, either with ether or chloroform, constituted, in his opinion, the greatest advance in the science of anæsthesia. The confidence which it inspired both in surgeon and anæsthetist in four classes of operations was of a nature that no other method achieved. These four classes were: (1) extensive face and intra-oral operations; (2) removal of goitres or other tumours about the neck; (3) lung surgery; (4) any operation entailing awkward positions for the patient.

Although gas and oxygen had been used for anæsthesia for over 50 years, its vogue had greatly increased lately. It had very definite limitations, but having strict regard to those it made an almost ideal anæsthetic in its own field. Administered after preliminary narcotics, with re-breathing, and with the minimum of ether or chloroform, it possessed very pronounced advantages in operations where a great degree of muscular relaxation was not demanded. Even in the latter class of case more use might well be made of it provided the surgeon was prepared to use novocaine locally in the tissues of the abdominal wall. Dr. Fairlie said that he did not restrict the use of oxygen to its accompaniment of nitrous oxide. His inclination was to use it more and more along with ether and especially chloroform. Any mixture of anæsthetic vapour and atmospheric air suffered from the high proportion of nitrogen. If the need for deep anæsthesia arose, this acted as a handicap—in other words, anæsthesia might be pushed further, with a greater degree of safety, in presence of a higher proportion of oxygen than the atmosphere contained. So in abdominal operations, particularly those of the upper abdomen, he frequently found a stream of oxygen led under the mask of great assistance. It prevented the onset of cyanosis with accompanying rigidity. It was useful in any operation where the patient, for one reason or another, had a tendency to cyanosis.

In conclusion, he pointed out that he had made no reference to spinal anæsthesia, from the feeling that it would introduce too large a subject.

In the discussion which followed, Dr. J. S. Ross (Edinburgh) said that it was important that the administration of chloroform should not become a lost art, and that it should be adequately taught to students. With regard to rectal anæsthesia, he considered that if surgeons would inform the anæsthetist in advance of patients who were terror-struck,

rectal anæsthesia might have a wider field of usefulness. He held that no theatre was properly equipped if it did not contain an oxygen cylinder with oxygen in it. The danger of nitrous oxide and oxygen lay in attempting to handle with it patients of too powerful a type, and in being ashamed to use adjuvants such as ether and possibly a little chloroform.—Dr. ROSS MACKENZIE (Aberdeen) agreed with previous speakers that students should be adequately instructed in the administration of chloroform. At the Sick Children's Hospital, Aberdeen, the majority of cases were conducted under nitrous oxide and oxygen combined, with very careful use of local infiltration with novocaine. With this help he considered that nitrous oxide and oxygen covered the largest field in children. An unusually high proportion of oxygen was required for a child and a mere trace of ether vapour during the induction period. There was very little after-sickness and a very rapid recovery. He had used rectal anæsthesia a good deal with children and personally liked the immediate results, but it threw a good deal on the nursing staff, and surgeons were inclined to think that there was more after-reaction than with the inhalation method.—Dr. A. OGSTON (Aberdeen) thought the very best relaxation could be obtained with gas oxygen if, in addition to the local infiltration at the seat of operation, the intercostal nerves were blocked as they emerged from the lower spaces.—Dr. J. JOHNSON (Aberdeen) agreed as to the importance of adding oxygen to open ether; particularly was this of value when the induction was expedited by the preliminary use of open ethyl chloride which was apt to lead to a little cyanosis unless oxygen was added.—Dr. A. MILLS (Dundee) did not agree as to the teaching of chloroform to students, considering it much more important to teach them open ether well and to impress on them the added dangers of chloroform. With regard to intra-tracheal anæsthesia he thought it was often unnecessary; if the surgeon were careful to mop out blood most of these cases could be met by pumping ether vapour with oxygen through the nose into the pharynx.—Dr. J. S. FREW (Glasgow) confirmed the value of oxygen with open ether or chloroform.—Dr. F. L. NAPIER (Glasgow) said he had come to rely very largely upon the Shipway apparatus for ether with a little chloroform added. He also was a great believer in adding oxygen to the combination, and used it to bubble through the apparatus instead of air.—Dr. W. BARRAS (Glasgow) agreed with Dr. Napier. He said that where malignant disease was present in the mouth he avoided the intra-tracheal method if possible, as he considered it quite a possibility that the catheter might carry infection down into the lung.—Dr. TORRANCE THOMSON (Edinburgh) considered it certain that when out in the world young practitioners would use chloroform very freely, and he therefore thought it essential that in their student days they should be taught it. He used oxygen both with open and closed ether and had found Pinson's oxygen valve of great value. He was a warm advocate of the use of the intra-tracheal method for abdominal sections, particularly for a high operation such as gall-bladder. He had had good results with nitrous oxide and oxygen given by this route, but found it very expensive. He had had very good results with ethanesal, but upon the whole he doubted whether it was really any better than a good brand of ether. For some months he had been using the Pinson bomb and regarded it upon the whole as the best method for open ether.—Dr. LOGAN TURNER (Edinburgh) expressed his appreciation of the invitation to him by the Society to attend the meeting and join in the discussion. He had always favoured the closest coöperation between various specialists, and certainly between the surgeon and the anæsthetist. He quite agreed that the anæsthetist should be informed precisely of the nature of the case and of all relevant points in connexion with it as soon as the appointment was made. In these days he had found very often that the anæsthetist's preparations required to be as complicated as, or more so, than those of the surgeon.

Dr. FAIRLIE, in reply, said that with regard to the teaching of the students, he personally favoured a deliberate attempt being made to wean the new members of the profession altogether from the habitual use of chloroform, and thought, therefore, that in teaching all the emphasis should be laid upon the simpler methods of giving ether.

Dr. J. H. GIBBS (Edinburgh) opened a discussion upon

Methods of Anæsthesia in Nasal, Dental, and Other Oral Operations.

He explained that he would simplify his remarks by speaking mainly of the methods which he personally used, and would exclude mostly from his observations the question of individual peculiarity in the patient, considering the anæsthetic solely in connexion with the locality or disease to be dealt with and not with any constitutional complaint such as cardiac or pulmonary disease. Mouth and nose operations had this peculiarity that the interests of the surgeon and the anæsthetist in many cases seemed to clash; each wanted to get at the patient at the same time. If ether was to be given he insisted upon a preliminary dose of atropine. One-hundredth of a grain was usually an adequate dose. If hæmorrhage was not likely he added heroin or morphia. Upon the whole, he thought that heroin gave less after-effects. His stock method for longer cases, such as antrum operations, was to induce with ethyl chloride and ether given with the Clover instrument and then change over to a Junker or Shipway, passing the vapour where possible along a catheter through the nose into the pharynx. For tonsils or adenoids in subjects up to 12 or 14 years of age he habitually used ethyl chloride, regarding 4 c.cm. as the maximum dose; latterly, he had been adding 1 c.cm. of ether and desired an expression of opinion from other members as to whether this addition increased the safety of ethyl chloride. For enucleation of tonsils, for which ethyl chloride alone would be inadequate, he used the Clover method of ether, getting a forecast from the surgeon as to the length of time which it would be desired the patient should remain under the anæsthesia. Here it was very necessary that the patient should have atropine, but morphia was undesirable. For paracentesis of the antrum nitrous oxide often sufficed. For mastoid operations he induced with ethyl chloride and ether in the Clover instrument, and followed up with open ether. For dental work he found that nitrous oxide or nitrous oxide and oxygen as a single-dose anæsthetic sufficed for anything up to three teeth, as a rule. For cases taking a little longer than this he added 1 c.cm. of ethyl chloride at the last moment. The patient need only take about five breaths of this, and some 10 seconds or more were thus added to the available anæsthesia. For cases demanding even longer time he used up to 2 or 3 c.cm. of ethyl chloride. Working on these lines, he had given 30,000 administrations of ethyl chloride or ethyl chloride and gas without fatality until recently, when he unfortunately had had a death in the dental department of the Royal Infirmary. The patient was sent to him for the extraction of 15 very septic teeth; she was absolutely panic-struck; he began the anæsthesia by giving her 3 c.cm. of ethyl chloride by the vapour method; during the early part of the administration she screamed almost continuously; she finally, however, went under, the colour remaining good. One tooth was extracted, when a slight amount of pallor and faintness of respiration was observed, the pupil remaining small, and he proceeded, therefore, to take out another tooth. The pallor then increased and he therefore stopped operating and had her lowered to the floor and commenced artificial respiration. The surgeon on duty was sent for and opened the abdomen in order to give cardiac massage, but by this time the patient was dead and did not respond in any way to the treatment. The patient was known to have suffered from rheumatic fever, but her heart had been thoroughly examined by a physician before the

anæsthetic and was believed to be perfectly sound. Owing to difficulties with the relatives it was most unfortunately impossible to secure an autopsy. It was arguable that this death was mostly due to the delayed effects of fright, but since the occurrence he had resolved always to add 1 c.cm. of ether to any ethyl chloride which he gave. There could, of course, be no absolute proof that this added to the safety, seeing the infinitesimally small death-rate from ethyl chloride given in the doses that he advocated. He had used nasal gas and nasal gas and oxygen extensively, but found that the ordinary nasal inhaler interfered a good deal with the work of the dentist. He therefore preferred his own appliance, which he showed to the meeting, where the gas was led by tubes into each side of the nose, the anterior nares being plugged by his instrument around the entering tubes. In working with nasal methods he had found great advantages from the use of a large sponge pushed on to the dorsum of the tongue; even with single-dose methods he used this sponge, believing that it prolonged the anæsthesia without producing any serious embarrassment of respiration. Small sponges as used by some dentists were dangerous. He emphasised the danger of anything but a straight sitting-up position for extraction of teeth. He had an extensive experience of intra-tracheal anæsthesia, but even now he thought the best results were obtained in malignant diseases of the mouth by doing a preliminary tracheotomy and packing the upper orifice of the larynx.

Dr. LOGAN TURNER said that he personally accepted the position that the anæsthetist as a specialist was entitled to choose the drug and method which should be used, but he pointed out that by law it was the surgeon who was responsible if anything happened. The surgeon and anæsthetist must be accustomed to work together and must have mutual confidence in each other's skill. He was a warm advocate of ethyl chloride given by vapour method for tonsils and adenoids in children (having had over 17,000 cases at the Royal Infirmary with only one fatality in 15 years), but not adults. He did not consider that by it sufficient relaxation of the muscles of the palate could be obtained to give the operation by the reverse tonsilotome a fair chance. Even for ethyl chloride he considered full preparation as for a major anæsthetic was essential. He had noticed reference in American literature to abscess of the lung following operations for tonsils and adenoids, which might be ascribed either to dropping a piece of tissue down the larynx or perhaps merely to the expression of septic fluids from the tonsil at the moment of removal. He personally had never experienced this sequela, but would be glad to know whether any of the members of the Society had heard of such cases.

The PRESIDENT said that as regards the point between heroin and morphia, he did think heroin produced less after-effects. He had had, however, very good results with "Abbott's H.M.C." preparation of morphia, and desired to know whether other members considered this preparation had any special advantages. He thought that intrapharyngeal anæsthesia by the Shipway method, which he employed, was inadequate in many cases as compared with true intra-tracheal, as one missed the return flow of air. He had no special fear of carrying malignant disease into the lung by the catheter, unless the ulcer was very foul, and thought the gain was tremendous over a tracheotomy opening. He agreed that ethyl chloride was inadequate for tonsils and adenoids in adults, using open ether followed if necessary by the Shipway, by nasal tube. For longer dental cases he made extensive use of nasal gas with air. He admitted that the counsel of perfection was to give it with oxygen, but the question of the weight of the cylinders made nasal gas and oxygen hardly practical politics. Admittedly certain cases could not be handled by nasal gas, and he always had a Clover ready. For children under 12, even for dental cases, he found gas, certainly nasal gas, unsuitable, and preferred to rely upon ethyl chloride alone. He regarded 3 c.cm. as the outside dose for a child and with it had only had one serious fright; the child, however, recovered. If 3 c.cm. of ethyl chloride was insufficient he preferred to use closed ether.

Dr. ROSS referred to O'Malley's technique for nasal operations, particularly for submucous resection of the septum. Its essentials were the tilting of the head of the table to an angle of 45°, a pillow placed behind the head and neck just down to the upper portion of the shoulders producing a slight flexion of the neck; the use of Phillips's artificial airway to produce strict oral respiration and a combination of local anæsthesia by packing the nose beforehand and continuing with a very light chloroform anæsthesia. Having worked with O'Malley for a short period during the war, he had been struck with the smoothness of events if every one of these details was strictly adhered to. Another point in O'Malley's methods was the use of a very deep nitrous oxide anæsthesia for the enucleation of tonsils and adenoids, even in young strong adults. He agreed with Dr. Gibbs that it was better to produce a deep anæsthesia with gas or gas and oxygen in the first instance, and to use a small dose of ethyl chloride in the last few seconds of the anæsthesia only. He was inclined to think that Guy's original instructions for the anæsthesia were slightly defective in that not enough advantage was taken of the nitrous oxide element before adding the ethyl chloride. With regard to nasal methods, the addition of oxygen enormously simplified the actual administration, but the question of the bulk and weight of the apparatus was so important that he had been specially interested in listening to Dr. Fairlie's experience of nasal gas without special provision for oxygen.

Dr. FREW said that with regard to septic lung trouble after operation, he had had two personal experiences: one was a lung abscess following the extraction of very septic teeth—no solid foreign body was ever detected in the lung and the patient eventually recovered. In another case septic trouble followed a piece of bone inhaled during an operation upon the antrum; lung abscess followed, the bone was ultimately coughed up, and here also complete recovery followed.—Dr. BARRAS said that he used ethyl chloride extensively among children and did not consider that there was in its use any very material after-sickness.—Dr. TORRANCE THOMSON alluded to the impossibility of proving that the addition of ether increased the safety of ethyl chloride; how could you prove it if you had to wait for 30,000 cases before you got your first death after ethyl chloride alone? The further question arose, however, of whether it improved the anæsthesia in type and duration. There was a belief among some people that it did. With regard to tonsils and adenoids in adults, he described Rood's method of saturating the patient with ether given from the open mask much overlaid with towels and blankets. In Rood's own hands the results seemed to be excellent.

Dr. GIBBS replied generally to the discussion. He was of opinion that chloroform should not be given after adrenalin. With regard to the sickness after ethyl chloride, he believed that there was a good deal but that it often came on later when the patient had left the dentist's house. Even apart from sickness there was undoubtedly a good deal of malaise and feeling of depression. He therefore gave the smallest dose possible.

At the close of the meeting Dr. TORRANCE THOMSON demonstrated the Pinson bomb and the intra-tracheal apparatus devised for use with it. He also showed Mr. N. Dott's intra-tracheal apparatus.

ABERDEEN MEDICO-CHIRURGICAL SOCIETY.

Early Active Movement in Relation to Fractures of the Upper Extremity.

A SPECIAL meeting of this Society was held on May 22nd, Dr. G. M. DUNCAN, the President, in the chair, when Mr. J. W. DOWDEN (Edinburgh) gave

a lecture on this subject. After referring to the frequent occurrence of these fractures, the anxiety experienced by both practitioner and patient for a good result, and the possibility, always present, of an action against the practitioner for malpraxis in the event of a bad result, Mr. Dowden emphasised especially the importance of a method of treatment which would lead to early recovery of function—a point of the utmost importance to the wage-earning patient, the insurance societies, and in the long run to the State. The longer the limb was kept in absolute immobility—e.g., by splints—the longer would restoration of function take, as the repair had proceeded on restricted lines. Briefly expressed, Mr. Dowden's treatment consisted in first making an effort to get the bones into good alignment, putting the arm into a sling, and giving heroin for the first few nights. As soon as possible, preferably in 24 hours, active movement should be begun, and, later, passive movements carried out by the patient, all joints of the limb being moved, and the movements always stopping short of pain. The arm should be allowed out of the sling for frequent periods during the day. In certain cases a splint might be used at night. The treatment should always be directed towards a good functional result rather than a perfect anatomical result, the chief consideration being paid to the muscles and joints, not solely to the fractured bones. Consequently in children even marked bony deformity could be ignored, as in time superfluous bone tissue and callus would be absorbed and alignment of the limb restored. Mr. Dowden detailed the precise methods used in the individual fractures at the common sites of the upper limb, illustrating his methods and results by numerous lantern slides of radiograms and photographs of patients. He then summarised the points of his treatment, of which he had had over 20 years' experience; the great principle was active movement, and the chief advantages were its simplicity, economy, and rapidity and excellence of result.

An animated discussion followed, in which there took part Mr. ALEX. MITCHELL, Mr. W. ANDERSON, Mr. G. H. COLT, Mr. F. K. SMITH, Dr. J. SMITH (Peterhead), and Dr. J. E. SKINNER (Skene). Questions were asked, and Mr. DOWDEN replied.

Reviews and Notices of Books.

GOITRE.

A Contribution to the Study of the Pathology and Treatment of the Diseases of the Thyroid Gland. By F. DE QUERVAIN, Professor of Clinical Surgery in the University of Berne. Translated from the French by J. SNOWMAN, M.D., M.R.C.P. London: John Bale, Sons and Danielsson, Ltd. 1924. Pp. 247. 21*s*.

THE genius of Kocher and the extraordinary incidence in Switzerland of enlargements of the thyroid have combined to give Berne a unique position in regard to the surgical treatment of goitre. The tradition has been carried on by Prof. de Quervain, whose name is already a household word in many fields of surgery and whose latest book is a masterly treatise on the subject. Characterised throughout by profound thought and wide scholarship, it teems with practical suggestions of real value.

One has to visit Berne to realise the gravity of the problem presented by goitre to the Swiss nation, but it is a sufficiently startling fact that of children of 16 in the schools of Berne 94 per cent. show some enlargement of the thyroid, whilst 15 per cent. have nodular goitres. Goitre in Switzerland is generally associated with a lowering of the thyroid secretion, resulting in extreme cases in cretinism. The cretin problem alone is a serious one for the country, for it means that a large number of the inhabitants must be cared for by the State, whilst every family is overshadowed by the possibility that an apparently healthy child may gradually reveal this terrible defect. In England the reverse is the case, thyroid enlargement being frequently associated with symptoms of secretory excess, and it has to be remembered throughout the book that in its author's experience only 5 per cent. of goitres were of this class. One of the most suggestive chapters is on the pathological physiology of the thyroid gland, and one cannot but be struck by the stress laid on the investigation of the metabolic rate as measured by the respiratory exchange. The relations between this, the histological structure, and the iodine content of the gland are presented in a very remarkable manner, and a clear outline is given of a problem of extreme complexity.

The diagnosis of goitre in its many varieties is elucidated by a splendid series of photographs and radiographs. As regards the latter, a most valuable point is made of the importance of an accurate study of tracheal compression, as regards site, direction, and degree. A glance at the tracings given should be enough to convince any surgeon of the reality of the danger to which the trachea may be exposed unless it has been previously located. In view of this it is somewhat remarkable that intra-tracheal anæsthesia has made so little headway in Switzerland and it is not even referred to by the author. Many surgeons in this country would regard it as the method of choice, both from its intrinsic safety and convenience and from the facility it gives to the operator. On the other hand, we in England make too little use of the advantages of local and regional anæsthesia, and there are few of us whose technique will not be benefited by a study of the methods described by the author. In the hands of Swiss surgeons these methods have provided the foundation of an exact and beautiful technique, remarkable for the absence of bleeding and the perfect exposure which it affords. But here again the contrast between the hypothyroidism of their patients and the frequent hyperthyroidism of our own has to be taken into account. On the technical side different methods and degrees of removal are fully described, and the difficulties and complications which may arise are considered. The author's method of ligating the inferior thyroid artery is of special value, and we have found by personal experience that it is safe, rapid, and easy. The whole question of ligating the arteries is well discussed, and precise directions are given for the avoidance of the parathyroids and the recurrent nerve.

The book is intended for those, both physicians and surgeons, who are specially interested in diseases of the thyroid gland. It presents in a small compass an immense amount of new and valuable information, gathered from the vast experience of the author. It is lucid and concise in expression, admirable in arrangement, and really well illustrated; whilst the translation by Dr. Snowman is so perfect that it is difficult to realise that it is not the author himself who speaks. To those of us who know the author there could be no higher praise. Prof. de Quervain has given us a book which will be read and re-read by all who are interested in the thyroid.

SURGICAL PATHOLOGY.

By JOSEPH MCFARLAND, M.D., Sc.D., Professor of Pathology in the Medical Department of the University of Pennsylvania. London: H. K. Lewis and Co., Ltd. 1924. Pp. 701. £2 2*s*.

THIS book is written on somewhat novel lines. Unhampered by convention, the author has felt free to choose what subjects he would consider and what proportion of space he would assign to each. Inasmuch as Prof. McFarland has written for those beginning to specialise in surgery, his book will, no doubt, serve a useful purpose; but the choice and arrangement of the subjects dealt with make it doubtful whether it will be equally helpful to the ordinary medical student. There is, for example, no systematic consideration of inflammation, infection and immunity or surgical bacteriology, nor are these subjects dealt with really adequately in the section on special pathology. This is all the more surprising since the

author defines surgical pathology as the bringing together and emphasising of those aspects of pathology which have been found to be of particular interest and importance to surgeons. Surely the diagnosis and treatment of processes of infection are of the utmost importance to the surgeon.

The book is divided into three parts. The first deals very fully with congenital conditions of surgical interest; the second treats of tumours; and in the third the pathological conditions of the various organs and tissues are discussed. In addition to the general index there is a bibliographic index, but since this is arranged in the alphabetical order of the authors' names rather than under subjects, its value is a good deal diminished; it will, however, serve to direct the attention of English readers to the literature of the United States and the Continent of Europe. The book is profusely illustrated and many of the illustrations are admirable; but others are equally bad, and it is to be regretted that some of the figures intended to elucidate the author's long description of the physiology and involution of the breast should be practically unintelligible.

While the surgical specialist will find much in Prof. McFarland's book of interest and value, it can hardly be recommended as a routine text-book for the less advanced student. Certain aspects of the subject are dealt with extremely well, but others of prime importance are omitted altogether or merely glanced at. And it is to be feared that the beginner who relied entirely upon Prof. McFarland's conception of what should constitute the surgeon's pathological equipment, would become conscious in the hour of trial of many gaps in his knowledge.

X RAY THERAPY.

Die Röntgenbehandlung des Uteruskarzinoms. By Dr. HERMANN WINTZ, O. Professor, Direktor der Universitäts-Frauenklinik, Erlangen. Leipzig: Georg Thieme. 1924. Pp. 30, plus 50 unnumbered pages of illustrations. £1 4*s*.

APPARENTLY a desire had frequently been expressed by those visiting the Erlangen Klinik for a description of the exact technique used in the treatment of carcinoma of the uterus. This book is the result. It does not describe in detail the apparatus used or the dosage given, as these have been gone into more fully elsewhere. It briefly refers to the preparation of the patient for treatment with the technical details of this preparation. Next, the copper electrolysis of the growth is described as an essential part of the treatment. Many, of course, will doubt its value. The book then comes to the part of the subject with which it is mainly concerned—viz., focusing the tube on the growth with all the attendant factors. This last part is illustrated by 50 clear and helpful plates, which leave little to be desired. In fact, these plates form the chief feature of the book, as they occupy more than half of its space. Finally, the after-treatment of the patient is described.

The author has written the book in the hope that it will help others to base a sound technique of their own, feeling there will be variations made by every practitioner to suit his needs. It certainly is a clear and simple description of the Erlangen technique for the treatment of carcinoma of the uterus, so far the most successful field of intensive therapy. It will help those who desire to know the Wintz exact method and can read German. The pictures might even help those who cannot.

Röntgentherapie, Oberflächen- und Tiefenbestrahlung. Sixth edition. By Dr. H. E. SCHMIDT. Rewritten and enlarged by Dr. A. HESSMAN, Dirigierender Arzt der Röntgenabteilung des Krankenhauses am Urban, Berlin. Berlin: August Hirschwald. 1923. Pp. 280. $1.95.

THIS type of text-book of X ray treatment seems to be turned out in considerable numbers in Central Europe. It contains a physical part which is competently written; it then goes on without inspiration, but with care to describe the technique of superficial and deep X ray treatment. This, of course, has all been done before somewhere else, not better perhaps, but often as well. Chapters are put in which deal with the problems of the day such as "Die Hygiene im Röntgenzimmer," in which the illuminating information that the room must have bright walls and not be darkened is given. It is all true and perhaps necessary. Then comes an astonishingly long list of all the diseases which can be more or less successfully treated by X rays. It is, perhaps, as well not to quote some as each disease no doubt has its X ray advocate, but the list taken altogether shows either great powers or great faith. The book is a sound one, helpful to the student of X ray treatment. It gives him a good foundation on which to work and useful practice in reading German.

INFECTION, IMMUNITY, AND BIOLOGIC THERAPY.

With special reference to Immunologic Technique. A Practical Text-book. Third edition. By JOHN A. KOLMER, M.D., Dr. P.H., D.Sc. (Hon.), Professor of Pathology and Bacteriology in the Graduate School of Medicine, University of Pennsylvania. With an introduction by ALLEN J. SMITH, M.D., Sc.D., LL.D., Professor of Pathology in the School of Medicine of the University of Pennsylvania. London and Philadelphia: W. B. Saunders Company. 1923. Pp. 1210. 60*s*.

TO call this book monumental would be to do less than justice to the author; for the term connotes finality and immutability—the last of the attributes that Prof. Kolmer would claim for his work or that its admirers would wish to see in it. Enduring as brass, however, it undoubtedly will be; one might even prophesy that a century from now, along with "Gray" and other medical classics, it will still be running into new editions. It would be unprofitable to speculate as to how much of the present matter will still find place in those future editions, but if unremitting and assiduous toil is to find its due acknowledgment, the name of Prof. Kolmer will still figure upon the title page.

The book is so well known to all practical pathologists and bacteriologists, that once the fact that a new edition has appeared and that it fully comes up to the standard of all its predecessors has been noted, little remains to be said. As in previous editions, the author has taken the greatest pains to bring his matter up to date almost to the hour of the final impression. Much that is new since the appearance of the last edition six years ago has been added; the additions are interesting as indicative of the advance made during those years in the theory of immunity and in its practical application. It must be admitted that the great movement initiated by the work of Bordet, Ehrlich, and others does not now advance so rapidly as of old, although it can hardly be said to have lost its force. The principal applications of immunologic therapy in which notable advance has been made since the last edition are the Schick reaction for diphtheria with the toxin-antitoxin method of immunisation of Behring, the technique for the transfusion of blood, the recognition of the existence and significance of the blood groups, and the diagnosis and treatment of the allergic conditions. Of these, the Schick reaction marks a real advance in preventive medicine; this subject is well discussed, and full details are given for the performance of all the necessary procedures. Here, as in all other sections of the book, Prof. Kolmer has not allowed his enthusiasm to run away with him, and clearly points out the dangers inherent in the immunisation process—dangers which can readily be avoided with proper care, but which are none the less very real. In the section on blood transfusion full directions are given both as to the indications for transfusion, the choice of method, and the selection of donors. Sir Almroth Wright's method of immuno-transfusion finds place in this section. In the chapter on iso-hæmagglutination, though bulk for bulk the work

on this subject done in America vastly outweighs that done in this country, it is pleasant to observe that Prof. Kolmer has accorded full recognition to the observations of English writers. Chapters XXIX.–XXXII. are devoted to the clinical allergies, and here again the author maintains an attitude of commendable discretion. In Chapter XXXIX., the principles, such as they are, of non-specific protein therapy are fully dealt with, and there appears to be hardly a use to which this peculiar form of medication has been applied and recorded which has escaped the author's notice. As to the matter included, the author might with advantage have been rather more drastic; a certain number of observations which have been discredited since the last edition still find a place in his pages, and do not help the general flow of the argument; a notable example of this occurs on p. 154. Vaughan's theory of the fermentative nature of the processes of immunity is hardly worthy of such lengthy treatment; the same applies to the schematic representation of the same processes elaborated by Ehrlich; in the light of present knowledge—or lack of it—the time would seem to have arrived when the intriguing pictures of test-tubes full of oddly shaped objects labelled "amboceptor" and so forth might be eliminated from pathological works. However, in face of the immense amount of work, good, bad, and indifferent, incessantly proceeding in all parts of the world, the problem of selection in works such as this must be of extraordinary difficulty.

The book is profusely and intelligently illustrated, and the illustrations, without being works of art, are well suited to fulfil the object for which they are designed. The references are numerous and useful.

SEXUAL LIFE.

The Sexual Life of Man. By Dr. PLACZEK. Translation revised by Dr. W. C. RIVERS. London: John Bale, Sons and Danielsson, Ltd. 1923. Pp. 233. 10*s.* 6*d.*

THIS work is intended to furnish an outline of our scientific knowledge of the sexual life of man for students, doctors, and lawyers, and was originally written by Dr. Placzek, a Berlin neurologist, on account of the difficulty experienced by students in obtaining the larger and better known text-books, which have in many cases gone out of print.

The book starts with a preliminary account of the anatomy and physiology of the sex organs, male and female, and with an outline of the normal history of sex from childhood to old age. This is followed by chapters dealing with genital gland deficiency, the results of castration, and the reciprocal action of the gonads to the other glands of internal secretion. The second half of the book deals with aberrations of the sexual impulse, the various forms of perversion and abnormal sexual impulses being briefly described and catalogued. Although we cannot go so far as Stekel that "In erotic matters there are no normal men," anomalies of the sexual impulse are so commonly met with that it is certainly necessary for every practitioner and lawyer to have some knowledge of this subject, and to those requiring a concise account of the commoner abnormalities Dr. Placzek's book will be useful. Indeed, in the English language there are few other works (with the notable exception of the classical works of Havelock Ellis) to which the student can resort for information, the subject not being one that appeals to English authors or publishers. While this book should therefore be of considerable use in this country, it contains many statements which are open to criticism. We consider the author's references to the work of Freud and of Jung unnecessarily scathing. It is true that fanatics of these creeds are commonly met with, but it is equally true that both Jung and Freud have made valuable contributions to our knowledge of the sexual life. Again, in the latter part of the work we find a reference to treatment by means of transplantation of human testicle. For this purpose cryptorchid testicles are recommended partly on the grounds that they are rich in interstitial cells, and partly because having no reproductive function they cannot transmit hereditary qualities! This, of course, implies that the transplanted testicle can function with respect both to internal and external secretion, and is an error of a very elementary nature. However, in spite of these deficiencies the book will be of use to those requiring a concise and at the same time comprehensive survey of the subject of the sexual life of man.

Sexuological Essays. By W. C. RIVERS, M.R.C.S., L.R.C.P., D.P.H. Leipzig: Curt Kabitzsch. 1924. Pp. 168. 7*s.* 6*d.* (Circulation limited to Medical Practitioners.)

IN this book Dr. Rivers shows his boldness when he announces that, for obvious reasons, he failed to find a publisher in England or America. He shows how various present-day movements, that for the prevention of venereal disease, for example, justify the study of sex on the ground of practical needs, but that there is still a strong opposition which denies to science the right to investigate it. After a chapter giving an outline of the sex instinct and its common anomalies, Dr. Rivers goes on to such varied subjects as kissing and its related actions, the homosexuality of Walt Whitman, masculine affection for cats, and the result of race miscegenation. The chapter on "medical women in the future" is anti-feminist, and he gives the impression of finding always the evidence he would like, as, for instance, when he says (p. 64) that particularly few women qualify in the minimum time because their health is not so constant as that of men. The book is stimulating, and the author is sure to meet with strong disapproval, for which he seems to be prepared.

MEDICAL AND VETERINARY ENTOMOLOGY.

Second edition. By WILLIAM B. HERMS, Professor of Pathology in the University of California; Consulting Entomologist for the California State Board of Health. New York: The Macmillan Company. 1923. Pp. 462. 28*s.*

THIS book is intended as a text-book for use in schools and colleges as well as a handbook for physicians, veterinarians, and public health officials—ambitious objects involving a uniformly high standard of work. The author's treatment of the various branches of entomology, especially where it affects man, is, however, unequal, while veterinary entomology is described in a palpably inadequate manner. The economic annual loss to the United States caused by insects is estimated by the Department of Agriculture at 800 million dollars and the vital loss at 348 millions, whereas it is solely with the latter aspect that this volume deals. The introductory portion, the little sallies into helminthology and protozoology, are excellent in so far as they constitute a historical record, but here the serious student of tropical medicine will find statements which are not generally accepted: as, for instance, Adie's account of the development of leishmania in the bed-bug (p. 7). The various families of insects are not described in detail. We note that the terms definitive and intermediate host, though correctly defined, are not strictly adhered to throughout the book. The unequal treatment of the various parasitic genera calls for some comment. The house-fly and its habits are treated at very great length, while a description of the important genus *Glossina* is crowded into less than half a page. Such popular terms as "roaches" for cockroaches, and "wrigglers" for mosquito larvæ would seem out of place in a scientific work.

We have nothing but praise for the chapter on parasites and parasitism; the definition of the various terms employed and the correlation of comparative protozoology, helminthology, and entomology are too seldom attempted in books of this description. If only for this chapter the book is well worth having.

LOVE IN CHILDREN AND ITS ABERRATIONS.

A Book for Parents and Teachers. By OSKAR PFISTER, Pastor in Zurich. Translated from the German by EDEN and CEDAR PAUL. London: Allen and Unwin. 1924. Pp. 572. 24s.

Pfister writes this book for the lay public, and the reader acquainted with his previous works will find himself covering a good deal of familiar ground. The author opens with an historical survey showing how love was treated as an important factor in human relations till the advent of scientific psychology, the attitude of which he illustrates by the observation that in the chief works of Wundt, the most highly respected psychologist of our day, there is not a word about love. To this attitude he ascribes it that scholasticism has "provided nothing of value for pedagogy, psychiatry, criminology, or the conduct of life." In his own studies he claims to restrict himself to the data of personal observation, and justifies his claim in so far as he freely provides histories of actual cases, treated by analysis, which supply a foundation for deductions and generalisations. One is nevertheless occasionally tripped up by such phrases as "it is obvious that" when the deduction is anything but obvious to the non-analytical reader. The book indicates the operation of family influences in producing neurotic disturbances and abnormalities through their effect upon the love impulse, and the application of psycho-analysis in unravelling the factors concerned. Most of his conclusions are derived from the analysis of adolescents and adults, and for an account of a child analysis Pfister falls back upon Hug-Hellmuth, whose description (p. 536) makes the analysis a trivial and unconvincing affair.

Notwithstanding a tendency to exhortation and the indifferent English that occasionally appears ("goods" as the plural of the abstract noun, for example), the book must be placed among the serious works on the subject. It conveys a large amount of important information of a kind not found in usual writings on child-life and development.

JOURNALS.

QUARTERLY JOURNAL OF MICROSCOPICAL SCIENCE.—The current part of this journal contains six memoirs dealing with various topics, including both vertebrate and invertebrate anatomy and histology. Prof. Bronté Gatenby leads off with an account of the Transition of Peritoneal Cells into Germ Cells in Gallus Bankiva, which is illustrated by one coloured plate and two process blocks in the text. The author shows that sexual cells are formed de novo, as was originally believed to be the case, from the peritoneal epithelium and not handed down from original germ cells segregated at the first division of the ovum. Both ways of formation of ova and testicular cells are to be met with in the animal kingdom, though present views on the continuity of the germ-plasm would seem to argue the original segregation as the older way. Dr. Gatenby, however, is convinced, and quotes facts due to the investigations of others as well as those discovered by himself in support of the twofold mode of origin.—In another paper Dr. Bahl continues his investigations into the nephridial system of earthworms. It should be pointed out, however, that although this naturalist has added a great deal to what is known upon this matter, he did not "discover" the existence of nephridia in the oligochæta which open into the enteron. This was found more than 30 years ago, and is recorded in Vol. XXXIII. of the journal under review.—A second memoir upon an oligochæte worm is also from the pen of a native of Hindustan, and deals with the development of the generative system of the aquatic worm Stylaria.—Other contributions include two by Mr. de Beer in the development of the head in heterodontus, and one on the skin of mammals, by Mr. Shapiro.

The Conduct of Medical Practice.

A Series of Articles by Experts dealing with the Difficulties Encountered in Professional Life and How to Meet Them.

XVII.—EQUAL PAY FOR EQUAL WORK.

BY FLORENCE E. BARRETT, M.D., M.S. LOND.,
PRESIDENT OF THE MEDICAL WOMEN'S FEDERATION.

ONE feature of the modern development in preventive medicine is the increasing number of full-time posts with definite salaries offered to qualified medical men and women. At the same time there has grown up within the medical profession a more or less pronounced professional trade unionism, which probably had its birth consciously or unconsciously in memories of the undignified position endured by doctors under the old club system, and in the fear that unless the medical profession itself fixed an adequate scale of salaries, which its members should honourably uphold, public bodies would whittle down remuneration to the minimum which would still attract applicants.

A High Standard for the Public Health Service.

The medical profession as a whole have agreed that £500 a year is the minimum that should be paid for whole-time work by a fully qualified man or woman. In the public health service a higher minimum has been fixed, coupled with a recommendation that no one should be appointed to these important posts who has not done at least three years post-graduate work of a kind which would qualify the candidate to fulfil adequately duties which have so potent an influence in preventive medicine. There is still some confusion in the minds of professional men and women with regard to the two different minima. It is not very long since £500 a year was fixed with the approval of the profession as being adequate pay for full-time appointments, and the more recent pronouncement that £600 a year should be the minimum accepted for public health posts is still unknown to many, while the reason for the different standard is obscure to others.

To the general public—including some who are holding positions on public bodies—the higher scale claimed in the public health services is merely an attempt of one branch of the profession to obtain higher salaries: they have not begun to realise that in the interests of the whole community it is wise to ensure that experienced people only should be appointed to these posts. This lack of understanding will only be remedied if all public health authorities responsible for appointments are induced to make it quite clear in their advertisements that application will only be accepted from candidates who have fulfilled the condition of at least three years' suitable post-graduate work. Only in this way, too, will the younger members of the profession learn that it is in the interests of the nation as a whole that responsible posts should be the reward of experience gained, and therefore that the remuneration is justifiably fixed at a rate which to some of the newly qualified seems unnecessarily high.

Partly arising from the failure of public bodies to advertise for graduates of three years' standing, and partly from the fact that just now the numbers of medical students of both sexes which filled our medical schools at the end of the war are qualifying and adding to the names on the Medical Register with unusual rapidity, a crisis is arising in the profession which is very serious for its future, and which will strain to the utmost the patience and loyalty of both men and women if it is to be successfully dealt with.

Sex-limited Advertisements.

The first attempt on the part of those responsible for public health offices to avoid the higher scale of salary has been to issue advertisements without conditions of experience for medical women at £500. Many women applied for these or asked for particulars

in complete ignorance of the fact that £500 a year was not recognised by the profession as an adequate salary. To all whose names were known, the Medical Women's Federation wrote acquainting them with the facts, and numbers of women to whom a post at £500 a year would have been a coveted prize did not apply, an act of self-sacrifice which all will recognise. Some had accepted posts* before knowing that it was below the professional standard, and had involved themselves in financial responsibility. In this way the present crisis has arisen which, put quite plainly, is an attempt to offer a lower scale of salaries to women in the profession than is offered to men for the same work.

The unfairness of such an offer is unnecessary to dwell upon in a medical journal. All know that the course of training, the diplomas taken, and the work done in public health appointments is the same for women as for men, and therefore any attempt to pay them less is a serious injustice. What we all have to recognise, however, is that it is impossible to lower the standard of pay given or the experience demanded from any one group in the profession without creating profound changes of one kind or another. There is no doubt that women will do the work as well as their male colleagues, and if women accept lower salaries the authorities will be quick to recognise that, by employing women, they can obtain as good an officer with economy of expenditure. The immediate result will be that all other local authorities will follow suit, and women will obtain the majority of the posts. The other alternative result would be that men would also accept posts at the lower standard—the facts suggest that they are as likely to succumb to the difficulties of their circumstances as women—and any attempt of the profession to fix its own standard, either for men or women, would be frustrated.

What there is at Stake.

There is, therefore, at the present time a need for the utmost loyalty from every member of the profession, because what is at stake is not merely a question of money, but the right of the medical profession, who are trained in matters which pertain to the health of the community, to advise as to the experience necessary in health officers, and the salary which can reasonably be expected to attract the right people. At first sight it may appear that the only question involved is the loyalty of women, and that their duty is simply to refuse posts in the public health service at less than £600 a year. But if under such pressure of refusal public authorities are obliged to raise the salary, and the same post under the more favourable conditions is then thrown open to men only, are men to feel free to supplant the women whose loyalty has won the battle in that particular instance? Again, should medical men feel justified in working under a public authority which openly announces its intention to pay medical women at a lower scale than medical men for the same work?

In fact, the question before the profession is, Are medical men and women to be mutually loyal in this crisis to the decisions of the profession as a whole, or is loyalty to be only on the side of the group chosen for attack? This question needs serious thought from all, because it must frankly be acknowledged that women cannot win this battle alone. If the posts they refuse can be immediately filled by men, their resistance will clearly mean the gradual exclusion of women from the public health service. Without the assistance of their men colleagues women would be obliged to give in, and we should probably find that some individuals will accept posts they desire for the sake of the experience it gives, and because they know that in certain branches of the public health services women are specially needed.

There is no doubt, however, that with the loyal assistance of the profession as a whole, individual women would be prepared in the future to sacrifice personal gain as they have done so often in the past, and thereby to retain for the profession the right to advise as to the conditions of service which should be offered in order to secure experienced doctors in posts where experience is necessary for the public weal. The Medical Women's Federation, which includes 900 women in practice, and many hundreds of associate students, is still unanimous in believing that equal pay for equal work should remain the standard in the profession, as it has always been in the past.

It is possible, however, that all men at the moment do not realise how vital a blow will be struck at the prestige and influence of the whole profession if this standard is not maintained.

* It is only fair to say that although some advertisements for junior whole-time appointments asked for women only, the numbers of men and of women respectively who have *accepted* underpaid posts are about equal.

New Inventions.

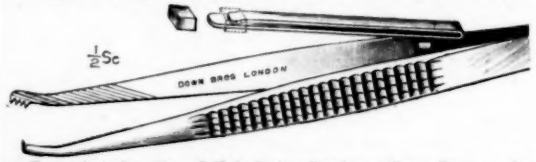
OPHTHALMOSCOPE ATTACHMENT.

OWING to the difficulty which many students and practitioners experience in performing ophthalmoscopic examination by the direct method with a Morton's ophthalmoscope, and owing to the expense entailed by the purchase of an electric instrument, we have devised (see figure) a simple attachment for the ordinary ophthalmoscope, by means of which it is possible to obtain the advantage of the electrical instrument at a comparatively small cost. The apparatus consists of a collar and an adjustable arm with a lamp-holder, which is fitted to the ophthalmoscope at the junction of the handle and the body. The electrical part is of the simplest, being merely a pocket battery, flexible wire, and a flash-lamp bulb. At a slight additional cost a variable resistance may be obtained. Messrs. Allen and Hanburys, Ltd., Wigmore-street, London, W., are the makers of the instrument.

W. O. C. JARRATT, M.R.C.S. Eng.
LEONARD P. LOCKHART, M.B., B.Ch. Camb.

A NEW MAGAZINE FOR MICHEL'S CLIPS.

THIS instrument, which is a combination of Childe's forceps with a fixed magazine, has proved very satisfactory in use. Its main advantage is that by virtue of the special serrations at the end of Childe's forceps it is quite easy to secure eversion of the skin edges



and maintain it whilst introducing the clips. An additional advantage is that it is so constructed that the magazine when in use lies parallel with the skin and the clips are drawn off from the lower end instead of the upper as in Bonney's instrument, a fact which brings the clips closer to the wound and makes for more rapid application. A special metal cap is also provided, which fits over the end of the magazine and prevents the clips from slipping off during sterilisation or while being carried in the surgeon's bag. I feel sure that those surgeons who use Michel's clips will find this magazine a useful addition to their surgical equipment. The instrument is made by Messrs. Down Bros., St. Thomas's-street, London, S.E.

Birmingham. BERNARD WARD, F.R.C.S.

THE LANCET.

LONDON: SATURDAY, JUNE 21, 1924.

HOSPITAL SUNDAY.

THE annual collection for the Metropolitan Hospital Sunday Fund will take place next Sunday, June 22nd, and it is not necessary to press the urgency of the appeal upon our readers. They are all fully aware of the conditions of debt and mendicancy under which many of our splendid voluntary institutions are compelled to carry on their work, and the general public know well that the situation is often a terribly anxious one. The fear is lest the appeal of the Fund should have become over-familiar. No more mis-used text was ever written than "Ye have the poor always with you," so easily can it be dislocated from its context and applied as a defence for inaction.

The methods which the hospitals most usually employ to obtain the support necessary for their conduct have become stereotyped, and though the totals of the annual collections give no reason to think as yet that these methods have lost their influence, still it is well that they should be reinforced by the support that comes from large consideration of hospital questions by representative citizens. There is now much opportunity for the general public to become alive to the real position of our voluntary hospitals, and also to appreciate the thoughtful and vigorous manner in which it is being dealt with. The Voluntary Hospitals Commission have just held a conference at which full facilities were given for reporting the proceedings; and this meeting was itself consecutive to a largely attended conference of medical, labour, and kindred organisations which met less than two months ago at Caxton Hall, Westminster. At this meeting general questions of hospital administration and control were fully discussed,[1] with the result that the Minister of Health asked the Voluntary Hospitals Commission to report to him upon the whole matter of additional hospital voluntary accommodation required in England and Wales and on the best means of providing and maintaining it. The discussion in the conference chamber of the Ministry of Health will show to all how vital to the national interests a sound provision of hospitals has now and admittedly become. And as we go to press the fourteenth annual conference of the British Hospitals Association is being held in Victory House, Leicester-square, under the presidency of Sir ARTHUR STANLEY. The relations of the voluntary hospitals to municipal authorities and to approved societies form the essential programme of this meeting, so that the important place in the whole of society occupied by the institutions will become apparent. Thus the functions at the close of this week form a fitting prelude to Hospital Sunday, for the real conditions under which financial stress and shortage of beds are endured will become clear to the public from the experience of different authorities, who will be able to make the statements of business men, and to appeal for hospital support on grounds of hard reason.

Not a word will be uttered which cannot be considered an argument for a generous response to the Hospital Fund. The subscription list of the Hospital Sunday Fund makes its more particular appeal to the ordinary householder, and neither he nor the members of his household are likely to forget the high prices of things necessary to daily life, the weight of taxation, and the depressing difficulty of making both ends meet. But if the Fund, through the stress of the times, loses old friends it should gain new ones on whose ears perhaps the arguments of scientific sociology may fall with a clearer message than any references to altruistic sentiment. Yet the grand message must remain that those who have should help those who have not. And still the plight of the suffering sick will draw response from the more fortunate. There is reason to hope that the Hospital Sunday Fund for 1924 will show a great return. The appeal is being made to a public which is becoming really informed.

[1] See THE LANCET, May 3rd, p. 923 et seq.

NEW WORK ON THE ÆTIOLOGY OF SCARLET FEVER.

RECENT work in America encourages the hope that the cloud of uncertainty which has so long enveloped the ætiology of scarlet fever is at last to be lifted, and that not only has the causative micro-organism been identified, but that we shall soon be in possession of effective means for the treatment and control of the disease. Last autumn Drs. GEORGE and GLADYS DICK[1] reported that they had been able to communicate the infection to a human subject by swabbing the throat with a culture of a hæmolytic streptococcus obtained from scarlet fever patients. In January they announced that they had succeeded in producing scarlet fever in another volunteer, on this occasion employing a different strain of the same micro-organism. As a control for this experiment they selected an individual who, having given a negative skin test, was presumably not susceptible, and this subject failed to develop the fever. The skin test employed, consisting of the intra-cutaneous introduction of 0·1 c.cm. of a diluted filtrate of the hæmolytic streptococcus and already known as the "Dick test," appears, like the analogous Schick reaction in diphtheria, to be positive only in susceptible persons.

In the investigation of their eponymous reaction Drs. GEORGE and GLADYS DICK[2] found that it was absent in 62 out of 65 scarlet fever convalescents, and also negative in 15 out of 16 individuals who had suffered from scarlet fever at some previous date, whereas 41 per cent. of persons who gave no history of having had the disease were positive reactors. These results have been confirmed by C. F. BRANCH and F. GILL EDWARDS,[3] who report that all the convalescent patients whom they tested, 65 in number, gave negative reactions, that three patients acutely ill with scarlet fever gave slightly positive results and became negative in convalescence, and that 40 per cent. of individuals with no history of scarlet fever, a percentage practically identical with that of the DICKS, were positive. Control tests with heated filtrate were consistently negative, and they conclude that the Dick test apparently has a specific relationship to immunity to scarlet fever. A similar view is expressed by A. ZINGHER,[4] who has made a very complete investigation of the reaction, and finds the susceptibility by age-groups from birth to adult life corresponds closely to the percentage susceptibility to diphtheria as shown by the Schick test. This

[1] Jour. A.M.A., Oct. 6th, 1923.
[2] Ibid., Jan. 26th, 1924.
[3] Ibid., April 19th, 1924.
[4] Proceedings of the Society for Experimental Biology and Medicine, 1924, xxi., pp. 293–298.

observer also noted positive reactions in the acute stage of the fever in all but three of nearly 100 cases examined, the patients giving negative results as they progressed into convalescence. Immunisation experiments with the streptococcus toxin have also been carried out by the DICKS[5] and by ZINGHER. Susceptibles when injected with suitable quantities of the filtrate may develop a scarlet fever rash with nausea, vomiting, and pyrexia of 48 hours' duration. After subsidence of these symptoms the skin test is found negative or slight. The effects appear to be produced rather by a soluble toxin than by a filtrable virus, as the incubation period is less than that of experimental scarlet fever, and, moreover, the filtrate shows resistance to a temperature which is sufficient to kill bacteria.

The DICKS [3] now report that they have succeeded in obtaining a specific antitoxin. They have immunised a horse by subcutaneous injections of sterile filtrate from broth cultures of the strains of streptococci that had produced experimental scarlet fever. The serum of the animal was first tested by being mixed with various dilutions of toxin, and it was found to be incapable of neutralising even weak dilutions. After increasing doses of toxin, up to 250 c.cm., had been administered, the horse's serum neutralised strong dilutions of toxin. This antitoxin was not destroyed or lost in the process of concentration. The authors conclude that its therapeutic value can only be determined when the results of its use in a large number of carefully controlled cases are available, and it is to be hoped that no time will be lost in submitting the antitoxin to such a trial. Notwithstanding the work of KLEIN, MERVYN GORDON, and others, many competent authorities have been inclined to regard the streptococcus more as a secondary invader, responsible merely for the septic manifestations of the disease, than as the causative micro-organism itself. In the light of these researches it looks as if such a view of the question requires revision. A very strong case has been made out for the hæmolytic streptococcus of the DICKS, and it is difficult, with the analogy of diphtheria before us, to question the specificity of a toxin which gives such results as have been mentioned above. Now that an antitoxin has been produced the employment of toxin-antitoxin mixtures bids fair to be a success, but it is obvious that time is required before we can have any real assurance that the control and treatment of scarlet fever will be on the same level as that of diphtheria. It may be added that the research was made possible by a large donation from Mr. HAROLD MCCORMICK, of Chicago, who had lost a child from scarlet fever.

THE DIAGNOSIS OF TUBERCULOSIS IN PENSIONERS.

A STRIKING and noteworthy outcome of the campaign against tuberculosis in this country is the recognition of the fact that diagnosis is often a problem of great difficulty, involving, in some cases, skilled observation of the patient over a matter of days or weeks along with expert consideration and appraisal of clinical, pathological, and radiological data. This is now officially recognised by the tuberculosis and pensions authorities. It is important that it should be more widely appreciated by the public generally, since too frequently patients and their friends expect from a single clinical examination a definite opinion as to diagnosis, prognosis, and treatment. The complexity of the problems involved is admirably illustrated by the interesting paper, published in our issue of last week, by Dr. ALEXANDER SANDISON and Dr. BASIL PRICE, of the Ministry of Pensions. At the outset they point out the special importance of accurate diagnosis from the point of view of the pensions authorities, especially in relation to their decision on the question of entitlement to pension. It is obviously of importance that this should be arrived at with full justice to the man claiming, but without detriment to the State. As long ago as 1920 the Ministry arranged for 100 cases, taken at random, of men pensioned for tuberculosis to be subjected to a comprehensive expert examination. It was found that about one-third were wrongly diagnosed as tuberculosis. In consequence of this, special arrangements were made for the observation and investigation of doubtful cases of tuberculosis amongst pensioners. The period of observation is limited to 28 days, but the average time taken is three weeks.

The observations recorded in this paper were made by Dr. PRICE upon pensioners in the London region admitted to the special observation beds at the Ministry of Pensions Hospital at Orpington, where 80 or more beds are available for the purpose, with special facilities for laboratory and X ray investigations. He bases his conclusions on 500 cases, of which 243 were regarded as pulmonary tuberculosis with "entitlement" for that condition. Only 37 of the 500 had records of tubercle bacilli having been found, and in only 8 of these were tubercle bacilli actually found while under observation. They were found in 13 of the remaining 206 cases, in which the diagnosis had previously been made on clinical grounds only. The results of the investigation demonstrated that in 9 per cent. of the 243 cases tubercle bacilli were present in the sputum or other secretions, 6 per cent. gave other evidence of activity. 50 per cent. presented quiescent or arrested lesions, while 33 per cent. gave no clear evidence of present or past tuberculosis. It will be noted that the percentage of wrong diagnoses is strikingly in agreement with that in the original 100 cases investigated in 1920. These figures would seem to indicate the need for similar careful observation of cases under suspicion of pulmonary tuberculosis in civilian practice, for there is no reason to suppose that the percentage of error is less in such patients than in the pensioners. The importance of this is indeed recognised by most of the tuberculosis authorities, who provide beds for special observation in chest hospitals and other institutions. It is also of importance in the well-to-do who do not come under the ægis of the official schemes, and it serves to emphasise the necessity for providing more general opportunities for study of tuberculosis in connexion with the medical schools, especially those not having a tuberculosis dispensary affiliated to them. It must be remembered that it is still the general practitioner in the majority of cases who first comes in contact with the patient and upon whom the responsibility of suspecting the disease in the first instance devolves. It is therefore necessary that adequate instruction for both undergraduate and post-graduate students should be provided, as well as means for special investigation of doubtful cases.

In the analysis of the 500 cases passed under observation, Dr. PRICE refers to the influence of syphilis, gassing, and gunshot wounds of the chest in regard to the incidence of tuberculosis, but no striking or noteworthy facts emerge. On the other hand, his observations on the relative value of clinical, pathological, and radiological evidence in the investigation of suspected tuberculosis are interesting and sugges-

[5] Jour. A.M.A., Feb. 16th, 1924.

tive. He allows that the complement-fixation test does not yet approach in value the Wassermann reaction in syphilis, though he claims that it may be helpful. He finds that a strong positive reaction suggests a tuberculous infection, but that its degree is not necessarily proportional to the clinical condition or to the activity of the disease. It may also be positive in non-tuberculous conditions, and the presence of a positive Wassermann reaction much impairs any deductions from a positive complement-fixation test unless the latter is of higher value than the Wassermann. Pirquet reactions were usually carried out, but gave no consistent results in regard to the complement-fixation tests; indeed, the observations were often mutually contradictory. Other tuberculin reactions were not employed owing to the possible risk of activating arrested or quiescent lesions. The examination of the sputum for albumin proved not to afford any help in diagnosis either as to the presence of the disease or to the activity when present. In regard to the value of radiographic reports, it is interesting to find that in 127 cases the X ray findings tended to corroborate the positive clinical evidence, while in 66 cases, in which on clinical grounds tuberculosis was diagnosed, the radiographic findings were negative. On the basis of these figures Dr. PRICE urges that the negative results of X ray examination must not be allowed to overweigh the diagnosis made on clinical grounds. He sums up his views on the relative values of clinical, pathological, and radiographic observations in diagnosis by maintaining that apart from the finding of tubercle bacilli the chief reliance must be placed on clinical evidence, a perspective with which most observers who are concerned in the diagnosis of pulmonary tuberculosis will agree. This conclusion serves further to emphasise the importance of the clinical study of this disease by students and practitioners.

NON-POTABLE SPIRIT.

IN accordance with the announcement in the Budget Statement, methylated spirit sold to the general public for domestic purposes has, since May 1st, contained an addition of crude pyridine in order to make it less acceptable as a beverage. The new mineralised spirit will contain, to be exact, crude pyridine 0·5 per cent., wood naphtha 9·5 per cent., mineral naphtha or paraffin oil 0·375 per cent., and methyl violet a trace. The Chancellor was advised that this spirit would be so nauseous and so difficult to swallow as to give pause to the would-be drinker, and if his reluctance were overcome, the draught would make the victim so ill (but not mortally) that he would be unlikely to attempt to defraud the Revenue by continuing to drink it. We learn from the *Chemist and Druggist* that it had been the practice by those who wished to drink the old methylated spirit to remove the petroleum by diluting and shaking the spirit with salt or charcoal. Our contemporary suggests that there is a simple method of separating the pyridine from the new spirit, and it remains to be seen whether the public will find this out or not. Major F. J. W. Porter, writing to us from the Surgical Nursing Home in Bombay, recommends the addition of one half per cent. each of caoutchoucine and pyridine for the denaturing of spirit for surgical purposes. Every surgeon, he says, knows that it is impossible to use tincture of iodine made from methylated spirit denatured by the British Customs, whereas that prepared by the Indian Customs in the way suggested can be used for such a purpose. He can see no reason why the British Excise authorities should not allow hospital spirit to be prepared in this manner, seeing that it is absolutely undrinkable even by Indian fishermen.

Annotations.

"Ne quid nimis."

LOCAL ANÆSTHESIA.

THERE is still a certain amount of rivalry between local and general methods of analgesia in the sense that one or other is more in favour in the practice of most surgical clinics, and a perspective can be obtained only by observing the practice at a number of centres. So much depends upon adequate technique and assistance, and where the arrangements are adapted for the one method things run so smoothly as to limit the demand for the other. Particularly is this the case where an abundant supply is available of highly-trained assistants in general anæsthesia. The growing experience and popularity of local anæsthesia is evident on perusal of the second abstract-review of this subject contained in the June issue of the *Prescriber* (Edinburgh), whose editor, Mr. Thomas Stephenson, D.Sc., F.R.S. Edin., has long made it a practice of collecting and collating information on the borderland of medicine and pharmacy. Attention is called in this review to the unrivalled position still occupied by cocaine by reason of the intensity and persistence of its local anæsthetic action. Novocaine appears to be destroyed by contact with the tissues, and of the series of allied preparations, such as eucaine, tropocaine, stovaine, and alypin, all seem to be harmful in some degree to the tissues surrounding the sensory nerve endings. In the case, however, of stovaine this damage may be slight or even negligible, in view of the remarkable results of 400 operations under spinal analgesia, related on p. 1256 by Mr. B. H. Slater, medical superintendent at St. Luke's Hospital, Bradford. No death in this series could be ascribed to the stovaine employed—the two patients dying on the table being already in a moribund condition—and Mr. Slater can of his own experience cite no disadvantage of spinal analgesia, provided the technique be correct, save the slight extra work which devolves on the surgeon. The advantages speak for themselves. Spinal analgesia is safer than general; it gives rise to no chest complications; the comfort of the patient is vastly increased, so that a stroll through the wards after operation day suggests "a convalescent home" in the case of spinal analgesia, and "the deck of a cross-Channel packet in dirty weather" in the case of general anæsthesia. With spinal anæsthesia the surgeon finds complete muscular relaxation; he has no anæsthetic anxiety; the patient does not suffer from shock and can be consulted if necessary during the operation; the air of the theatre remains pure. General anæsthesia must set its claims very high to overshadow this record. The review in the *Prescriber* alludes to another application of regional anæsthesia, originated by Sellheim in 1905, of which more is likely to be heard: paravertebral anæsthesia consists in blocking the last five dorsal nerves on each side by means of novocaine injection, and has been lauded as the method of choice for operations on the kidney. Of other new local anæsthetics set out in the review, we have already given attention to tutocaine. There remains apothesine, a local anæsthetic of the novocaine type, effective for injection anæsthesia, the solutions not being injured by boiling; and a new substance known as butesin, which in the form of picrate salt combines anæsthetic and antiseptic properties and may fill a useful place in the treatment of burns, ulcers, and other denuded painful lesions of the skin. Surgeons and anæsthetists will be grateful to the *Prescriber* for the readily accessible form in which so much accurate information is given.

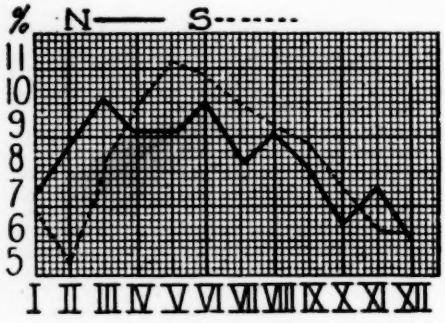
ACUTE GONORRHŒA IN WOMEN.

THE treatment of acute gonorrhœa in women, which is discussed on p. 1281, presents certain sociological difficulties not encountered in any other condition except syphilis. The point of most moment is whether or not the patient should be informed of the nature of the complaint, and, if she suspects

already, whether the suspicion, when accurate, should be confirmed. There are obvious disadvantages in a bald statement of facts, and one should be guided largely by the history accompanying the case. A newly married woman can acquire an acute infection from a mild and almost forgotten gleet nearly as readily as from an acute infection in the male. Similarly, women after childbirth, or when debilitated, may succumb to an infection which normally might not affect them. Again, a woman can harbour the gonococcus in the cervix, apparently for years, until some fortuitous circumstance precipitates an acute salpingitis. Obviously, there are great difficulties in apportioning blame in these circumstances, and no hard-and-fast rule is applicable. Legally, only evidence of the presence of the gonococcus in smear or culture can be accepted as a positive proof of the diagnosis, although it is well known that the organism cannot be isolated in a large proportion of genuine cases of gonorrhœa in women. The wise course, therefore, would be to treat the condition adequately, and, only if called upon, to pronounce definitely, after bacteriological proof, on the nature of the disease.

SPRING TIREDNESS AS A VITAMIN-DEFICIENCY.

IN a paper illuminated by some instructive statistics, Dr. R. Ehrström,[1] of Helsingfors, has made out a case for regarding spring tiredness not merely as a neurosis, but as an expression of vitamin deficiency. His first graph represents a study of the first attendances during 1921 and 1922 at the University Polyclinic in Helsingfors of patients whose symptoms were exclusively or mainly characteristic of neuroses. There were 3039 such patients whose first attendances during the 12 months of the year are mapped out in the heavy line of the graph. It will be seen that these



N = NEUROSES, S = SUICIDES.

first attendances were most frequent in the spring—the period when general lassitude is most common. After midsummer the graph shows a rapid fall which, except for two slight interruptions, is maintained till the end of the year. The dotted line represents the monthly incidence of the 5471 suicides committed in Finland in the period 1851–1907. It will be seen at a glance that the profile of the two lines is remarkably similar, and Dr. Ehrström suggests that this similarity is due to identity of the factors responsible for both. Their height towards midsummer might suggest to the casual observer that the sunlight and warmth of the early summer had exercised a deleterious effect on the stability of the nervous system, but this is an explanation which Dr. Ehrström does not accept. The incidence of neuroses between April and August and between October and February was as 9·1 to 7·2, and, in the case of suicides, as 10·1 to 6·5, and these differences were, in his opinion, a matter of accessory food substances or vitamins. The good effects of an adequate supply and the ill-effects of an inadequate supply of these substances would seem to be comparatively slow in showing themselves. In the spring, and even in the early summer, the inhabitants of Finland still suffer from the inadequacy of their vitamin supplies during the winter, and the good effects of an adequate supply of vitamins being also tardy, December finds most persons in Finland still enjoying the benefits of the short summer of Northern Europe. As Dr. Ehrström puts it: "We are well in the autumn after the light and open-air life of the summer, and we feel unwell in the spring after the darkness of the winter and a sojourn within four walls. We live, so to speak, in the autumn and winter on the stored-up light of the summer." The fact that animal life in general suffers from the same handicap as human beings in this matter prevents the inhabitants of Finland from making good the shortage of vitamins in the vegetable kingdom by living on the animal kingdom and its products. Dr. Ehrström's study and the conclusion he draws from it, although going at present a little beyond the facts submitted, certainly stress the value of the accessory food substances and the importance of agencies such as sunlight, for which we have only imperfect substitutes. Let us hope that we may be able in the future to bottle and tap such substitutes at our own free will, regulating them with the precision of the gardener whose reservoirs of water enable him to regard with equanimity a persistently cloudless sky.

[1] Finska Läkaresallskapets Handlingar, 1924, lxvi., 210.

MEDICAL EXAMINATION OF FACTORY ENTRANTS.

THE Association of Certifying Factory Surgeons has issued a report in which adverse comment is made upon the findings of the Home Office Committee on the medical examination of young persons for factory employment. These findings, which were briefly stated in our issue of May 24th, are important in that they deal with the very basis of factory medical service, and are concerned with the examination of over a quarter of a million juveniles every year. Both the report of the Association and the findings of the Committee agree in holding that at present all is not as it should be. Many of the criticisms in the report seem to us to be well founded, and they cannot be readily put on one side, as they express the opinion of those practically acquainted with the present position. Perusal of the findings of the Committee and of the comments of the Association leaves an uncomfortable impression that the Home Office Committee have been more concerned with deciding what department should control the work than with making the work really effective. In their short and hurried existence they did not delve deep or consider the fundamental question how to apply the principles of public health medical service, as undertaken by local authorities, to our factory organisation. The Ministry of Health calls upon local authorities to carry out certain medical duties, the Ministry bears a proportion of the expenses incurred, while it leaves to each authority free choice of medical personnel for carrying out the duties. Local authorities appoint for themselves the doctor who is to inspect their children at school, and who, able to obtain advice from medical experts at headquarters, becomes a trusted adviser on all matters concerned with the health of the local school population. So it is with other branches of the public health service which relies essentially on local acquiescence in sound advice rather than upon compulsory action. This method, for various reasons, has not been followed in factory medical service. Here the factory presents a new grouping of the population, which should, like the locality, have free choice of its medical service. But, in fact, the appointments have been made in London, the fees to be paid have been fixed in London, and revision of the appointments has not been a habit at headquarters. Hence, the factory owner has come to regard the certifying surgeon more as an interfering outsider than as a useful friend. The wonder is not that factory medical service is unsatisfactory, but that it is so little unsatisfactory. This it owes to our national capacity for service even when badly organised. The question is whether the time has not come to revise the factory service on the

lines of the public health service, when duties would be imposed by legislation, but the choice of doctor would be left to the factory. Inspection might remain, as now, in the hands of a staff of medical experts, reporting to the Home Office, to the Ministry of Health, or to the local authority itself. Once industry appoints its own medical advisers the scope and standard of the work performed would soon exceed legal requirements. Much is made in the report of the Association, and rightly made, of the need for coöperation with school medical service, so that records of school years may be available when the young person starts on his life's work. Surely if the employer and that young person, through his parents, both require access to these records, the question of granting access could and would not be resisted. Any attempt to build upon this needed coöperation a reason for imposing the school medical service upon industry would do little to arouse interest among workers and employers.

THE ENTRY-APERTURE OF THE OVUM.

IT is only within the present century that the older conception of the implantation of the ovum within the uterus has been replaced by the present-day description, which makes it attain its position by a process of destruction of the superficial part of the stratum compactum of the decidua. The earlier view postulated the well-known reflected, basal, and "true" layers of the mucosa, and the later belief replaces these with a "capsular" for the "reflexa" and a "parietalis" for the "vera." An aperture of entry, through which the ovum comes into the implantation cavity in the decidua, is, then, a necessity of the process, and is in fact well known to all who are acquainted with the literature on the subject. Not many human embryologists, however, have ever had the chance of studying this in actual specimens, and many are only acquainted with what is said by some to be the site of its former position, the "scar" of Reichert. But those who are able to examine the site shortly after the opening has closed will find it occluded by a fibrinous plug, which does not seem to have the leucocyte infiltration pointing to decidual origin. This would seem to be explained by a new description of the immediate closing of the aperture, given by Prof. T. H. Bryce in the very important and highly interesting lectures on Early Human Ova, delivered by him at King's College last month. He showed reason for believing that the aperture is closed at first directly by the trophoblast itself, this being modified later, presumably. In one of the sections he showed on the screen the outer layer was definitely projecting from the opening. This observation is of interest not only as providing for early closure while the ovum is enlarging, and accounting for the state already mentioned as existing a short time afterwards, but also as having some bearing on the question of the condition of the uterine cavity. Moreover, it may have some pathological connexions which will call for elucidation in the future.

THE THERAPEUTIC VALUE OF CINCHONINE.

Sir David Prain, in his Chadwick lecture, reported in THE LANCET of June 7th, remarked that, in view of the complaints of a world shortage of quinine, it must not be decided without consideration that the other alkaloids of cinchona bark are of no value. When this question comes up for settlement attention will have to be paid to a report on this subject recently published by Dr. Wilhelm Cordes,[1] working in the Tropical Medicine School at Hamburg. The author notes that cinchonine, following on the recommendation of Rogers,[2] Acton,[3] and others, is widely praised in Italy as an efficient substitute for quinine. To decide this question for the Hamburg cases he treated 16 early cases of first attacks of tropical (malignant) malaria, giving them all the usual treatment, except that, for each gramme of quinine in the routine, he substituted 1·1 g. of cinchonine alkaloid, the equivalent of 1·5 g. of cinchonine hydrochloride. The alkaloid is tasteless and easy to take, and it was absorbed and excreted in the urine as quickly as quinine, but it proved more ready to cause gastric uneasiness and vomiting. With this treatment, seven of the patients were at once cured, just as he would have expected to happen with quinine. The other nine lost their first attack of fever much as if they had been treated with quinine, but relapses were more frequent, and to secure their complete recovery quinine had to be given to them at last. He found, too, by study of blood films, that *P. falciparum* was less influenced by cinchonine than by quinine, for with it the ring-forms persisted longer in the blood, and reappeared more quickly when it was intermitted. Dr. Cordes concludes that cinchonine is less effective than quinine in the treatment of malignant malaria, although, like other observers, he found it could cure benign tertian, which, he remarks, is relieved by smaller doses of quinine, and even by arsenical preparations which have slight or no influence on the malignant form. On this evidence he has decided definitely that cinchonine cannot fully take the place of quinine. It might prove useful in places where *falciparum* infection does not occur.

[1] Archiv für Schiffs- u. Tropen-Hygiene, March, 1924.
[2] Brit. Med. Jour., 1918, ii., 459.
[3] THE LANCET, 1920, i., 1257.

SEX-INCIDENCE OF CAUSES OF DEATH.

SOME of the differences in the death-rate of males and females from individual diseases are both puzzling and suggestive. From their effect on the total death-rate the most important of these are tuberculosis, cancer, and syphilis. The crude annual death-rate from phthisis in England and Wales in the year 1922 was 31 per cent. higher in males than in females; while the death-rate from cancer was 11 per cent. higher in females than in males. Such death-rates evidently need further analysis to be satisfactory. In this country tuberculosis of the alimentary tract is slightly higher in males, but in the United States it is stated, in a recent statistical bulletin of the Metropolitan Life Insurance Company of New York, to kill more women than men. The cancer death-rate especially needs subdivision. Thus in 1922 the death-rate from cancer of the buccal cavity was more than seven times as great in men as in women; cancers of the pharynx, œsophagus, stomach, and liver were 28 per cent. more fatal in men than in women; but as cancer of the female genital organs and breasts caused over 25 per cent. of the total female cancer mortality, these more than accounted for the excess of female over male mortality from cancer. Evidently the local incidence of cancer in the two sexes points the way to further investigation into the exciting causes of malignant disease and to the possible adoption of preventive measures. The greater amount of syphilis in males than in females has much social significance. It points to the fact that extra-marital relations are the chief source of this disease; and that notwithstanding the terrible amount of syphilis imported by men into married life, this does not suffice to cause as much mischief as is produced by irregular sexual congress. The figures for general paralysis of the insane confirm this conclusion, the death-rate from this disease being five times as great in men as in women. In the bulletin referred to above, a number of illustrations of sex differences in the incidence of disease are given. The higher death-rate from whooping-cough in girls is well known, and the heavier incidence of all forms of goitre on women appears to be well established. In this country diabetes mellitus is slightly more fatal in women than in men; but in America the reverse appears to be the rule, a difference which may be explicable by the fact that men are more often examined for life insurance than women, and thus in women the

disease goes oftener undetected than in men. Pernicious anæmia again is stated to be more common in males in America; in this country, according to official figures, the death-rate is more than 13 per cent. higher in women than in men.

THE FOOD-POISONING INCIDENT AT WEMBLEY.

SOME anxiety has been felt in regard to the recent outbreak of acute gastro-enteritis among visitors to the British Empire Exhibition at Wembley, and Major-General S. Guise-Moores, late R.A.M.C., director of medical services at the Exhibition, has been good enough to furnish us with the following notes.

"Eighty-seven cases of intestinal disturbance accompanied by vomiting, diarrhœa, abdominal pain, and constitutional symptoms, varying in severity, were admitted to the main ambulance station between the hours of 1 and 8 P.M. on June 9th last. The first symptoms supervened from one to three hours after partaking the 'mid-day' meal. The particular causative agent was the veal and ham pie, which was eaten by all the patients without exception. The clinical and symptomatic evidence points to a constitutional disorder due to the absorption of a toxin or toxins present in that food before it was consumed, and was not due to a bacterial infection of the food with subsequent multiplication in the intestine. The majority of the cases admitted to the main ambulance station were sent to their homes by car the same evening. Those that lived at too great a distance from the Exhibition, nine in number, were despatched by motor ambulance to the Willesden General Hospital that night, and discharged the next day. The 'pies' were withdrawn from the restaurants in their entirety very soon after the first cases were seen at the ambulance station. Samples of the pies have been sent for bacteriological investigation and report. Separate investigations are being carried out by the Exhibition authorities, the Ministry of Health, and the caterers concerned. The Ministry of Health has interested itself in the matter and sent Dr. Hancock to interview the D.M.S. of the Exhibition."

General Guise-Moores concludes: "It is considered that local conditions played no part in the causation of this outbreak, but that it possibly lies with factors which at present are difficult to control."

SMOKE ABATEMENT AT NOTTINGHAM.

THE experiment described in the *Municipal Journal* of June 6th, which is about to be made by the Nottingham Corporation in order to abolish smoke, should prove of great interest. It has been realised for some years that the partial coking of coal at a temperature below that used in ordinary gas-works was one of the means which might help towards the solution of the smoke problem, providing as it does a smokeless fuel suitable for domestic use as well as a rich gas and valuable by-products. The difficulty in the past has been to find a commercially practicable method, since the cost as well as the quality of the fuel produced is one of the governing factors. A market for by-products is also essential for the commercial success of such an undertaking. The industry of lace-making, which is special to Nottingham, calls for a very clean air, and this doubtless had some influence in deciding the corporation. The conditions under which 1000 tons of coal per day can be treated at a colliery in the vicinity of the city which provides a market for the solid fuel, gas, and by-products produced should give the experiment every chance of success. We must join issue, however, with our contemporary when it is stated, with reference to smoke, that "municipal authorities are unable to accomplish any improvement worth speaking about." Measurements show that in London and Glasgow there has been a great and steady improvement in the direction of smoke reduction of recent years. There are, unfortunately, no measurements of smoke pollution available for Nottingham, which may, therefore, call itself a "clean city" without fear of contradiction. We would urge the corporation to obtain such measurements without delay for comparison with future conditions which will result from their experiment. Such figures would be of real value both to Nottingham and to the country generally as indicating the degree of success attained.

NEW MENTAL HOSPITAL ACCOMMODATION.

LACK of hospital accommodation for mental disease is acute and almost universal: so long has it prevailed, indeed, that the communal conscience is in danger of becoming hardened. Two bright spots are on the picture. One is the opening, just as we go to press, by the Minister of Health of the West Park Mental Hospital, the fifth institution to be provided by the London County Council on the Horton estate at Epsom. This hospital, when completed, will accommodate 2096 patients (1128 males and 968 females), and includes an admission block, villas for convalescent patients, special wards for the treatment of tuberculosis and dysentery. A chapel, infirmary, and acute wards for female patients will not be ready for occupation until the end of 1925. The other bright spot is the decision of the governing body of the St. Andrew's Hospital for Mental Diseases at Northampton to erect a special hospital for the reception and treatment of early cases of mental disorder. The foundation-stone is to be laid on June 27th, and judging by the plans contained in a circular accompanying an invitation to this ceremony, a very careful study has been made of arrangements elsewhere for the separation of the recently admitted from the chronic insane. Visits were paid by the subcommittee entrusted with this duty to several psychiatric clinics on the Continent, and to an English spa for the purpose of studying hydrotherapy, which is to be an important feature of the treatment employed in the new hospital. Accommodation will be provided for 16 patients of each sex. The equipment of this hospital will evidently be more varied and extensive than that of any other institution of its size in this country. Ten varieties of hydrotherapy are provided for, bacteriological and chemical laboratories, rooms for X-ray and electrical treatment, a dentists' room, and various other facilities for special treatment. The authorities of the St. Andrew's Hospital are to be congratulated on tackling with such vigour an urgent problem which is beset with difficulties. Not only will the expense of building this hospital be considerable, but the expense of maintaining it in full working order will probably be equivalent to a capital expenditure many times greater than the cost of building. A numerous staff will be required in order to administer its special departments with due efficiency, although in regard to laboratory investigations it will be open to the hospital to avail itself of the Joint Board of Research for Mental Disease when material can be sent to Hollymoor for investigation. A précis of the year's research work there appears on p. 1286. We have no information at present as to the arrangements in view for staffing St. Andrew's Hospital, or as to the proportion of the cost of upkeep which is to be borne by the patients. It is observed that the hospital "can, if necessary, be extended," and one may safely predict that such extension will be found desirable. The facilities for treatment are arranged on such a scale as to be capable of dealing with a much larger number of patients than can be accommodated in the hospital as planned at present. The success of this venture will be watched with keen interest by mental hospital authorities throughout the country. In the millennium of lunacy administration such a reception hospital will be considered a sine qua non by every large institution, and in the meantime it is probable that wherever extended accommodation is required the extension will take some such form as this.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

LXXVI.

THE TREATMENT OF ACUTE GONORRHŒA IN THE FEMALE.

GONORRHŒA in the female may start acutely or begin so insidiously that it is scarcely noticed at first by the patient. Pregnant women, and those who have borne several children, are so accustomed to transient attacks of frequency of micturition and leucorrhœa that, in cases of the disease commencing mildly, the condition may not be recognised until complications ensue. As a rule, the younger the patient the more acute the onset. In a case suspected to be gonococcal, the patient should be instructed (1) not to douche for 24 hours before examination, (2) not to empty the bladder for at least three hours before being seen. Neglect to observe these precautions may completely invalidate any opinion expressed as to the absence of the gonococcus in mild cases.

Symptoms.

In private practice there may be some difficulty in getting patients, especially recently married women, to submit to a complete examination, particularly when smears are taken for slides and culture. But the importance of checking the condition at the onset is so great that every effort should be made to establish the diagnosis definitely. The word "inflammation" covers a multitude of sins, and gonorrhœa need not be mentioned unless one is compelled to do so.

The four main signs in the adult are vulvitis, bartholinitis, urethritis, and endocervicitis.

Vulvitis in the adult is usually secondary to a bartholinitis, urethritis, or endocervicitis. The mucous membrane of the vulva in the adult, unlike that in the child, is not readily attacked by the gonococcus until secondary infections by staphylococci or the *Bacillus coli* are superadded to the previous gonococcal trouble. Vulvitis in the adult, therefore, usually occurs in neglected cases, debilitated patients, and women of weak mentality. It yields readily to medicated baths when the conditions causing it are treated adequately.

Bartholinitis.—Inflammation of Bartholin's gland and duct is generally gonococcal. It is unilateral in 60 per cent. of cases. If the duct is inflamed, the orifice on the inner surface of the labium minus, opposite the vestibule, will show as a yellow punctum surrounded by an almond-shaped inflamed area—the "gonococcal macule." The gland is not palpable in health. If it can be felt in the lower third of the labium majus it may be assumed to be enlarged. The condition is usually associated with a vulvitis, and in the early stages can be aborted readily by two injections of 1 c.cm. manganese butyrate (1 per cent.) given, at five days' interval, intramuscularly into alternate buttocks. This drug acts like a charm in the primary inflammatory stage; the vulva clears up, the small central abscess comes to the surface and discharges, the septic condition quickly subsides. If, however, there is already an abscess the size of a walnut, associated with a much swollen labium, the ideal treatment is a T-shaped incision, complete removal of the gland, and gauze packing of the cavity to ensure healing from the bottom.

Urethritis.—This is present in 80 per cent. of cases, but the subjective symptoms are often so mild that only about 5 per cent. of women give a history of pain and frequency. Attention, therefore, is often concentrated on the cervix alone, with the result that, when this is cured, the patient is often pronounced free whilst still dangerously contagious. When urethritis is present, examination will show pus (either directly or after massaging the urethra from the vagina), or inflammatory thickening, induration, or pain on pressure. In addition, the presence of the gonococcus can often be demonstrated in the paraurethral or suburethral crypts. Skene's ducts, two small cul-de-sacs opening on either side or just inside the urethra, are constant sites of infection. Treatment consists in irrigating the urethra with permanganate of potash, 1/10,000, by means of a two-way cannula. Or, instead, one may use a female urethral syringe with a fenestrated nozzle, and inject 1 per cent. protargol in glycerine daily in acute cases, or 10 per cent. protargol in glycerine weekly in chronic cases. As a rule, the female urethra is very tolerant of topical treatment; but occasionally, especially if acute cystitis is present, local treatment cannot be carried out, and then one has to rely on medicated sitz-baths and alkaline treatment for the cystitis. There are a few Littre's glands in the female urethra, and soft infiltrations and suburethral abscesses form occasionally, with subsequent risk of stricture. For these, massage from the vagina on a straight metal sound—22–24–26 French—followed by irrigation, is the treatment indicated. Skene's ducts, and any paraurethral crypts infected, should be obliterated by probes tipped with fused silver nitrate or the thermo-cautery.

Acute endocervicitis is, of course, the cardinal lesion in the adult female. It is also the most difficult to cure; for here we are dealing with a columnar epithelium having many crypts, pouring out an alkaline secretion—in every way the most favourable possible nidus for the gonococcus. The main symptom is a profuse, persistent "vaginal discharge." The carunculæ myrtiformes are generally inflamed, and so examination is painful or impossible in the very early stages. As soon, however, as a speculum can be passed it will be found that the vagina itself is little implicated, but that the cervix is enlarged and tender, the canal is friable, bleeds easily, and is pouring out a thickish yellow discharge over the somewhat eroded posterior lip of the os. Treatment consists in douching the vagina twice daily to remove the discharge, and treating the cervical canal with topical applications as soon as a speculum can be introduced without undue pain. Many combinations of drugs have been tried for this condition. The two methods described below have proved satisfactory.

Hypochlorous Acid Treatment.

This consists in using any of the various chlorine preparations—e.g., Dakin's fluid in the form of chloramine-T, or one of the hypertonic solutions of sod. hypochlorite now on the market, as a douche twice daily, and also as a topical application to the endocervix once a day. The strength of the douche is 1/1000 to 1/500. Douches only are used at first until it is possible to pass a speculum. As soon as this period arrives the instrument is inserted daily if possible—certainly not less than twice weekly—and the fornices and cervix swabbed clear, by means of wool on holders, of the veil of pus and mucus obscuring the field of operation. The cervical canal is next freed from discharge and mucus by Playfair probes tipped with cotton-wool, either dry or soaked in peroxide of hydrogen. When the canal is clear the chlorine solution in a strength of 10 per cent. is similarly applied up to the internal os; and the vagina finally swabbed out with wool on a holder as the speculum is being withdrawn. At the same sitting any inflammatory foci around the urethral or vaginal orifices are also treated. Should there be frequency of micturition a bladder irrigation of 1/1000 is used. These manipulations, combined with a daily sitz-bath, will cause rapid improvement in about ten days; and one can then lengthen the time between topical treatments according to the symptoms. Another drug which can be used in the same manner and in the same strengths is acriflavine.

An equally successful method is the manganese-contramine treatment introduced by McDonagh. The patient is put to bed and an intramuscular injection of 1 c.cm. manganese butyrate is given, followed

by a 1·5 c.cm. injection on the fifth day. This drug reduces the acutely painful stage of profuse discharge to a few days; and douches of pot. permanganate, 1/4000, are then given for the next three or four days. The patient is then started on a course of 30 contramine pessaries. These are inserted nightly against the cervix, and held in position by a gauze tampon. The tampon is removed in the morning, when another permanganate douche is given. At the end of the course smears are taken, and if still positive the contramine is repeated. Markedly good results have been obtained by this treatment. For subacute cases, when the patient is seen for the first time after the condition has lasted some months, it will be found that 10 per cent. protargol in glycerine, twice weekly, is an excellent topical application. Each treatment by this drug should be completed by inserting a gauze tampon, soaked in the same medicament, packed round the cervix. There it remains for 12 hours, when it is withdrawn by means of its string, and a douche of 1 per cent. lactic acid given. Normally, the vagina is acid, its acidity being due probably to the *Bacillus acidi lactici*. The strength of the acidity is 0·9 per cent., and this is inimical to most bacteria. Lactic acid in 1 per cent. solution is therefore recommended as a vaginal douche in all chronic conditions because it is the nearest approach to Nature's method.

The Rationale of Douching.

Douching was at one time the only treatment used in combating this disease; and it is still too frequently relied upon in general practice. Many of the drugs used were not only physiologically unsound, but positively detrimental. The so-called mucous membrane of the vagina is not a real mucous membrane. It is a modified skin with a surface composed of squamous epithelium. There are no glands in it, and it is therefore extremely resistant to organisms. Substances like corrosive sublimate, silver nitrate, picric acid, alum, zinc, any of the coal-tar preparations which precipitate albumin, largely destroy the normal protective mechanism by producing a desquamation of the surface epithelium, thus allowing the gonococcus to penetrate much more easily than it otherwise could. A great deal of the "granular vaginitis," which used to be so common years ago, was undoubtedly due to the over-use of powerful caustic douches such as corrosive sublimate; and the reason why we do not see this condition anything like so frequently to-day is because a much more sensible view is now taken of the value of antiseptics as curative agents in themselves. In gonococcal disease the practice of douching with these powerful antiseptics originated from the erroneous assumption that the vagina was infected with the gonococcus, and that any cervical discharge also present could be cured by the vaginal douches used. It is unfortunate from the standpoint of rational treatment that the mucous membrane of the vagina is comparatively insensitive, and so these caustics can be used with impunity—caustics which simply erode away the normal protective layers of the epithelium and so allow infective organisms to penetrate. Powerful antiseptics are not required in the vagina; they do not affect the cervix. Primary gonococcal vaginitis, except in children and in extreme old age, is very rare. Douching the vagina, therefore, should be largely for the mechanical purpose of getting rid of discharge; and a mild acid preparation, such as 1 per cent. lactic, or boric, or any of the preparations such as Dakin's fluid, which does not precipitate albumin, should be used, unless, of course, an infective vaginitis is present.

J. JOHNSTON ABRAHAM, C.B.E., D.S.O., F.R.C.S.,
Surgeon, the London Lock Hospitals.

ST. THOMAS'S HOSPITAL MEDICAL SCHOOL.—The annual distribution of prizes will take place in the Governors' Hall on Friday, June 27th, at 3.30 P.M., when the Duke of Connaught will preside. There will be tea and music on the terrace.

Public Health Services.

SCHOOL MEDICAL SERVICE.

Sheffield.

OF a school roll of close on 84,000, nearly 30,000 children were examined during routine inspection and 19·6 per cent. of the elementary school population were referred for treatment, 12·5 per cent. of these being kept for further observation and 94·8 receiving treatment. The medical staff consists of the school medical officer with seven full-time and five part-time assistants, a chief school nurse with 25 full-time assistant nurses, three dental attendants, and a dispenser. The most recent council schools contain special rooms for medical inspection, and in four schools branch clinics have been established. An extra evening clinic for the treatment of toothache is held three times a week, and its success is evidenced by an average attendance of 44 children each evening. Although verminous conditions have decreased considerably, it is a great pity that attention to bodily cleanliness has diminished. Dr. T. Chetwood reasonably attributes this to closing the shower baths in four of the largest schools. The popularity of the school clinics is demonstrated by the total attendances, which numbered 238,236, an appreciable increase on the figures for 1908, when 34 per cent. of those requiring it obtained treatment. A study of the steady rise in the number of those obtaining treatment in successive years leads inevitably to the conclusion that the popularity of the clinic as well as increased facilities for treatment are the responsible factors. Dr. Chetwood points out that there is obviously a limit which should be set high beyond which it is impossible to go, some children naturally leaving school before treatment is completed and others, a smaller number, being lost sight of owing to removals or other causes, and a trifling percentage who refuse treatment.

The number of cases treated at the X ray and skin clinic totalled 5910 for the year. The incidence of ringworm has diminished considerably, the number of children presenting generalised infection being considerably smaller. Parents now present themselves asking for X ray treatment for the children. The number of scabies cases, too, has dwindled to less than 200, and there has also disappeared the large number of severe impetiginous infections so common up to the end of 1922. Whiteley Wood and Springvale House continue to show good results, and plans are being made to increase the accommodation in both those open-air schools.

Dr. Percival J. Hay has made an elaborate investigation into the ability of the myopic child to maintain a working distance of 30 cm. when wearing glasses. Fifty-three children were examined individually under correction, and the farthest distance at which the finest Jaeger types the child was capable of seeing was noted. Tables are given showing the near vision at 30 cm. and at the distance preferred by the child. "It is natural that all these children would select the distance which would give them best vision and to ask them to keep their work at a longer distance seems to be futile. In any case, it would seem to be wise to find out first what a child's vision is at 30 cm. before we enjoin upon him to keep at that distance." But is Dr. Hay not mistaking the purpose of the sight-saving schools which is to eliminate near work entirely from the curriculum? In a properly conducted myope school no child should be asked to work as close as 30 cm., the kinæsthetic sense is trained as far as possible, and all fine work is taboo. And, in any case, by finer correction many of these children could, no doubt, have had their optimum working distance adjusted to 30 cm. Physical instruction is being dealt with in Sheffield on a thoroughly scientific basis, and in spite of economic restrictions the needs of the Sheffield school children in this direction are being well looked after.

Bootle.

There has been an increase in the amount of work done in all branches of the medical service during the

year and the dental work has been extended by the appointment of a second part-time dentist. Out of 3213 children referred for dental treatment 2481 were dealt with. The number of elementary school children examined under the code groups was 4134, and of these 38 per cent. required treatment. Special examinations and inspections amounted to over 9000. Eleven selected cases of discharging ears were treated by zinc ionisation. Four were cured after from 4 to 11 administrations, three ceased attendance, and seven were carried into the new year. The orthopædic scheme with the remedial exercises clinic is working well. 332 cases were treated during the year and 4442 attendances were made. Mouth-breathers accounted for 129 of these, and infantile paralysis for 52.

Shrewsbury.

Shrewsbury has an average school attendance of 3715, and of these 1248 were medically examined; 3·8 per cent. required treatment, and altogether 1148 children made 6371 attendances at the school clinic. Ringworm of the scalp accounted for 183, ringworm of the body for 152, impetigo for 523, and 679 attended for verminous conditions; 4755 attendances are classed as "miscellaneous." Dental treatment was given to 158 children. An effort is being made to educate the children in elementary hygiene, and the result of this ought shortly to make itself evident in the schools. Dr. H. E. Smith deplores the verminous condition of the children, and the prevalence of impetigo which accompanies personal uncleanliness. He attributes the state of things largely to laziness on the part of both parents and children. The teacher can do a great deal in this direction, and the introduction of lessons on personal hygiene if made practical enough ought to stimulate a consciousness of uncleanliness in the children. But precept without practice is worthless.

Bedford.

The work of "following up" has been extended in this county by arrangement with the Bedfordshire Nursing Association for the district nurse to be present at medical inspection, and later on to visit the homes for the purpose of ascertaining whether treatment has been obtained, and if not, to advise and assist parents in obtaining it. A fee of 7*s.* 6*d.* and a capitation grant of 6*d.* per child medically examined is paid for the nurse's attendance. The teachers in this way have the help and coöperation of the district nurse, and although dealing with verminous conditions may cause difficulty at first, the utilisation of the district nurse in this connexion ought to be a distinct advantage to the county. More attention has been paid to paving, draining, and re-tarring playgrounds this year, and the water-carriage system has been introduced into two schools. The number of children examined in the routine group was 5483, and 69·3 per cent. of the parents were present. Dr. R. T. Herdman emphasises the importance of dry shoes and stockings for children coming from a distance. He says that parents, not teachers, make a difficulty of this matter, and steps are being taken to educate parents.

Hartlepool.

After the resignation of Dr. G. A. Jubb in April of last year, the post of school medical officer was vacant until Dr. W. McKendrick took over the work after the summer holidays, with the result that much leeway had to be overtaken, as no routine inspections were undertaken until September. Owing to unemployment, many children were compelled to go poorly clad and bootless to school, and funds were raised to provide boots and stockings for these children. There were 14 cases of malnutrition found, none of which required actual treatment. Parents attend the examinations well, and the school clinic is well patronised. Dental treatment is going ahead, and a clinic is shortly to be opened in Hartlepool, so that the long journey to West Hartlepool, hitherto necessary, will be avoided.

Gillingham.

Dr. W. A. Muir, senior medical officer, states that since the last report a considerable improvement has been effected in the general cleanliness of school sanitary arrangements. Sanitary inspectors now inspect at frequent intervals. Much still remains to be done; in one school there is one hand-basin to 200 boys, and Gillingham is by no means alone in such a penury. Now that so much has been accomplished in remedial provision, it is time to concentrate on preventive measures. Cleanliness is the most important of these—cleanliness of schools and scholars—and here, as Dr. Muir states, example is better than precept. "A few practical examples of sound hygiene are infinitely more valuable than innumerable lessons on health." In Gillingham if only one nit is found on the hair the child is classified as verminous, with the result that of the 15,763 children examined at the nurses' inspections, 9·6 per cent. were found verminous. Sacker combs can be hired by the parents at a charge of 1*d.* The Danish method of treatment for scabies was adopted during the latter half of the year, and in most cases resulted in a cure after a single application. Among 2086 children medically examined, only four cases of rickets were found.

At *Bournemouth* the school medical officer, Dr. W. V. T. Styles, impresses upon parents the advantages they have in living near the sea. They are advised gradually to tan the bodies of their children by exposing them by stages to the sun's rays on the beach in the summer months. Systematic treatment for pre-tuberculous children by sun-baths is carried out daily with excellent results.

INFECTIOUS DISEASES IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 7TH, 1924.

Notifications.—The following cases of infectious diseases were notified during the week—namely, small-pox, 69; scarlet fever, 1344; diphtheria, 657 (as against 788 of the previous week); enteric fever, 82; pneumonia, 742 (as against 900 of the previous week); puerperal fever, 43; cerebro-spinal fever, 3 (as against 14 of the previous week); acute poliomyelitis, 3; acute polio-encephalitis, 1; encephalitis lethargica, 179 (as against 251 of the previous week); continued fever, 1; dysentery, 10; ophthalmia neonatorum, 139. There were no cases of cholera, plague, typhus fever, or trench fever notified during the week. Of the 69 cases of small-pox, 27 were notified from the county of Derby (Derby 10, Chesterfield 11), and 13 from Northumberland (Ashington). Of the cases of encephalitis lethargica, 22 were notified from the County of London, 11 from the county of Durham, 4 from Bristol, 26 from the county of Lancaster (Liverpool 10), Northumberland 11 (Newcastle-upon-Tyne 6, Wallsend 4), Yorks, East Riding, 9 (Hull 8), Yorks, West Riding, 22 (Sheffield 10, Halifax 2, Bradford 2 Wakefield 2, Wetherby 2), and Monmouth 3.

Deaths.—In the aggregate of great towns the deaths from influenza fell further from 52 to 46. There were in London 8 deaths from diphtheria, 6 only from measles.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Cmdr. J. Thornhill is placed on Retd. List, with the rank of Surg. Capt.

ROYAL ARMY MEDICAL CORPS.

Temp. Maj. S. L. Hinde relinquishes his commission and retains the rank of Maj.

ARMY RESERVE OF OFFICERS.

Lt.-Col. F. E. Gunter, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

Capt. H. A. Harbison ceases to belong to the Res. of Off. on account of physical unfitness.

ROYAL AIR FORCE.

The undermentioned are granted short service commissions as Flying Officers: A. Dickson and A. A. Townsend.

RESERVE OF AIR FORCE OFFICERS.

Flying Officer on probation A. Dickson resigns his commission.

INDIAN MEDICAL SERVICE.

Col. R. Heard, K.H.S., to be Maj.-Gen.

Lt.-Col. E. F. E. Baines to be Col.

HONORARY PHYSICIANS AND HONORARY SURGEONS TO THE KING.

To be Honorary Physicians: Col. H. J. K. Bamfield, I.M.S., vice Maj.-Gen. Sir Courtenay C. Manifold, I.M.S. retd.; Col. J. H. McDonald, I.M.S., vice Maj.-Gen. C. H. Bowle-Evans, I.M.S. retd.; Lt.-Col. A. Hooton, I.M.S., vice Maj.-Gen. W. E. Jennings, I.M.S. retd.

To be Honorary Surgeons: Col. F. Wall, I.M.S., vice Col. W. G. Pridmore, I.M.S. retd.; Col. P. Dee, I.M.S., vice Col. H. A. Smith, I.M.S. retd.; Maj.-Gen. T. H. Symons, I.M.S., vice Maj.-Gen. Sir Gerald G. Giffard, I.M.S. retd.

DEATHS IN THE SERVICES.

Major Valentine Good Johnson, R.A.M.C., who died at Sidmouth on June 14th, qualified from St. Mary's Hospital with the Conjoint Diploma in 1905, and had been clinical assistant at the London Lock Hospital and house physician at the Bethlem Royal Hospital. He joined the Army as Lieutenant R.A.M.C. in 1906, reached the rank of Captain in 1909, and that of Major in 1918. He was only 45 years of age, and leaves a wife and many friends to mourn their loss.

Special Articles.

VENEREAL DISEASE IN BELGIUM.

A Successful Campaign.

A PAPER by Dr. L. Bernard,[1] of Brussels, on the work of his dispensary shows that gonorrhœa is on the wane, and syphilis is rapidly disappearing as the result of the concerted measures recently taken against them. It is strange to read of a chancre as a rarity, as a lesion which teachers show to students with the words: "Mark it well, for you may never see it again." During the five years the first State dispensary has existed in Brussels, records have been compiled of 3319 cases representing 57,674 attendances. Of these 3319 cases, 1126 were due to syphilis, 1348 to gonorrhœa, 15 to chancroid, and 1 to inguinal lympho-granuloma. The remaining 829 persons attended the dispensary because they wrongly feared they were suffering from venereal disease. Gonorrhœa being much more prevalent than syphilis, it is remarkable that the numbers of these two diseases treated at the dispensary were approximately equal. Evidently many cases of gonorrhœa never come to a dispensary for skilled treatment, and this is one reason why the incidence of gonorrhœa is not declining as rapidly as that of syphilis. Another curious difference between syphilis and gonorrhœa was the relative numbers of the two sexes: apart from the cases in children, there were 729 male and 376 female cases of syphilis, and 996 male and only 348 female cases of gonorrhœa. These figures suggest that gonorrhœa in the female is comparatively often overlooked.

The Importance of Specialist Diagnosis and Treatment.

Dr. Bernard publishes statistics, culled from official notifications, showing the numerical differences in the diagnoses of syphilis and chancroid in fully equipped dispensaries managed by specialists on the one hand, and under the conditions of a private consultation on the other. In 1921 the ratio of chancroid to syphilis was 0·74 per cent. at the dispensaries and 5·15 per cent. at private consultations. As the same great differences were observed in 1920 and 1919, they were evidently not accidental, and it is probable that, for want of sufficient knowledge and laboratory equipment, physicians are apt to mistake many cases of syphilis for chancroid. It may not matter much to the community if a case of chancroid is taken for one of syphilis, but the opposite mistake may have serious consequences for both the patient and the community.

The Disappearing Chancre.

In 1920 there were as many as 108 cases of primary chancre seen at the dispensary. In 1921 this figure had fallen to 38, and in 1922 to 12. In 1923 there were 16 such cases. In the same period there was a corresponding fall in the number of cases of secondary syphilis, from 102 in 1920 to 11 in 1923. But the number of cases of syphilis, showing no apparent lesion, rose from 74 in 1920 to 147 in 1923. This decline of the proportion of primary cases to all the cases of syphilis from 35·64 per cent. in 1920 to 8·42 per cent. in 1923 is an amazing achievement. Dr. Bernard publishes a chart showing the connexion between various administrative Acts and the incidence of syphilis and gonorrhœa. Thus, in the second quarter of 1920, the Belgian Government provided every doctor in the country with a free supply of specific arsenical preparations, and already in the same quarter the chart shows an abrupt fall in the number of cases of primary syphilis. The same chart brings out the interesting fact that propaganda movements tend to coincide with a great increase in the number of persons coming to the dispensaries for examination, although they are not suffering from venereal disease.

Sources of Infection in Male Cases of Venereal Disease.

Dr. Bernard's classification of the sources of infection shows some surprising observations. Not a single case could be traced to the "official" prostitutes who number about 300 in Brussels, but over 56 per cent. of all the new cases could be traced to clandestine prostitutes. Another 24 per cent. could be traced to "femmes de passage"—a somewhat ill-defined class which played an important part in the dissemination of venereal disease after the armistice when the home-coming, demobilised soldier was received with more warmth than discretion by his patriotic countrywomen. Only about 16 per cent. of the new infections could be traced to mistresses, and only between 2 and 3 per cent. to wives.

Importance of Examining the Cerebro-spinal Fluid in Syphilis.

The following statistics show how unsafe it is to rely solely on a negative serological examination in deciding whether or not syphilis has been cured. In 1923 there were 109 cases of syphilis in which the Bordet-Gengou reaction was negative in the blood and there had been no clinical signs of activity for six months to two years. But only in 30 of these cases was the reaction negative in the cerebro-spinal fluid—in other words, the cerebro-spinal fluid showed signs of persistent disease in more than 71 per cent. of the 109 sero-negative cases. In view of these findings Dr. Bernard insists that a syphilitic patient who contemplates matrimony or departure to the Belgian colonies should have his cerebro-spinal fluid as well as his blood tested for syphilis before conclusions are drawn as to his fitness for either step.

Arsenical or Bismuth Compounds in Syphilis.

In 805 cases arsenobenzene and in 248 cases bismuth preparations were given. Signs of arsenical poisoning occurred in as great a proportion as 18 per cent., but no fatalities had to be recorded, although in nine cases the sequels, such as exfoliative erythrodermia, were serious. On one occasion a supply of arsenobenzene appeared to be particularly toxic, and this consignment was therefore withdrawn by the manufacturers. The number of cases of arsenical poisoning was greatest during 1919, 1920, and 1921, and it would seem that the improvement observed in this respect during 1922 and 1923 must be traced to the conditions under which arsenobenzene is manufactured. The monopoly enjoyed by two manufacturing firms no longer exists, but the many manufacturers now turning out arsenobenzene and similar antisyphilitic preparations have since 1922 been under Government control. Dr. Bernard's experience with bismuth is most promising. Among his 248 cases treated with bismuth there were only 19 in which stomatitis developed. No case of nephritis was observed, and there were only two doubtful cases of jaundice. Bismuth would seem to be more effective than the arsenic preparations in

[1] Bruxelles-Médical, 1924, iv., 448.

neuro-syphilis, and there can be no doubt that it is far safer to administer. Practically the only risk associated with it is that of stomatitis, and this can, to a great extent, be avoided by careful hygiene of the mouth. The discovery of bismuth is most opportune now that cases of arseno-resistant syphilis are becoming common. Dr. Bernard's opinion of the value of bismuth is so high that he considers it desirable for bismuth to be provided by his Government free of charge.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

The Feeding of Unconscious Persons.

AT a recent meeting of the Vienna Medical Society Dr. Flesch demonstrated his method of feeding persons who are functionally unable to swallow. He refrains from introducing a nasal tube, especially in cases of meningitis, cerebral hæmorrhage, general sepsis, or other conditions of partial or complete unconsciousness. In these persons either a diminished tonus of the jaws and the muscular apparatus of deglutition, with consequent dropping of the lower jaw, or extreme dryness of the mouth or pain, renders swallowing impossible. If sensation is completely absent the reflexes disappear and an endeavour must be made to feed the patient per rectum. Dr. Flesch's method of feeding is as follows. The patient is placed flat on his back and a few grammes (3–5) of lukewarm milk, coffee, soup, &c., are instilled, by means of a dropper or a small spoon, into the nostrils. The liquid makes its way along the vertical floor of the lower nasal passage, drops on the inclined plane of the posterior pharyngeal wall—at an angle of about 110°—and rapidly flows directly into the uppermost part of the œsophagus, where the constrictor pharyngis inferior presses it into the œsophagus. This happens without even touching the laryngeal region, so that there is no danger of aspiration. The method is applicable even when the corneal reflex is absent, for it has been shown by X ray experiments, made with a barium emulsion, that this pharyngeal reflex seems to be the "ultimum moriens" of the act of deglutition. In order to prevent the desiccation of the mucous membrane of the mouth in patients with prolonged and intractable mouth-breathing in coma, unconsciousness, and high fever, Dr. Flesch has constructed a small apparatus which closes the lips but contains a valve, through which expiration only is possible. Thus the patient is forced to inspire through the nose, whilst the moistened expiratory air-blast can pass out through the mouth. The apparatus can be worn for a prolonged period without any harm to the lips.

Prof. Pirquet's Fiftieth Birthday.

The fiftieth birthday of Freiherr Clemens von Pirquet was celebrated recently by his numerous friends and pupils with unusual solemnity. In his clinic the professor was the recipient of congratulations from all sources on this occasion, and the learned societies of Austria, as well as the pediatric societies of Germany and other countries, sent delegates to the professor, expressing their good wishes and their esteem. A special meeting of the Austrian Society for Pediatrics was held on May 12th, in which Prof. Magerhofer, one of Pirquet's oldest pupils from the University of Zagrele (Yougoslavia), delivered an address on the biological value of Pirquet's investigations. It may be mentioned here that Prof. Pirquet was at one time director of the children's clinic at the Johns Hopkins University in Baltimore, and of a similar clinic in Breslau (Germany), before he was called upon to take over the Vienna University children's clinic at the early age of 37. His reputation is international; his reaction is now one of the fundamental principles in diagnosis of tuberculosis. This method was worked out by him when still a young assistant of Prof. Escherich in this city. The problems offered by the infectious diseases soon attracted his attention, and his investigations on allergy gave a solid base for the modern methods of therapy with protein bodies; together with Schick he studied the so-called serum disease and the process of immunisation by vaccination. One of the latest additions to modern therapeutics was the systematic control of nutrition by means of the Nem method—i.e., the nutritional value of foods calculated by the caloric value of 1 g. milk as unit. This method facilitated the systematic feeding of hundreds of thousands of starving children by the "Save the Children Fund" and "Famine Area Fund" of Great Britain and the United States at a minimal cost and with a maximum effect. The clinic where Pirquet has been working for the last 13 years has become the Mecca of doctors desiring knowledge of the important art of treating the ailments of childhood. Original research, excellent organisation, and independent ideas are the leading features of his work.

The Medical Profession and the Problem of Artificial Abortion.

As has been mentioned in a previous letter (vide THE LANCET, Jan. 12th) forensic authorities have taken a very energetic attitude in regard to artificial interruption of pregnancy, even when performed by medical men. In fact, the Supreme Court has recently inflicted severe penalties on several doctors who were charged with having induced abortion without absolute necessity. An order of this court went so far as to make it imperative for all persons coming professionally to a knowledge of an abortion to report the matter to the police. The medical profession has most vehemently protested against such an infringement of the existing law compelling the doctor to maintain professional secrecy. The medical council is supporting the profession in this struggle, and an organised campaign is being maintained in order to bring about a change of legislation in accordance with the requirements of modern views and the necessities of modern life. Whilst supporters of eugenics strongly advocate the widespread use of contraceptives and the instruction of the poorer classes in their use, another section, and by no means a minority section, of the profession favours rather a control of births by giving doctors or a committee of health officers discretionary powers to advise and produce abortion in the first three months of pregnancy. Recently a mass meeting of the profession, attended by about 40 per cent. of the doctors of Vienna, discussed this problem. While Prof. Tandler explained the necessity of birth control from the sociological standpoint—namely, to prevent an excess of offspring in poor families, leading to pauperism—Prof. Hammerschlag pointed out that in the case of deaf-mute or mentally diseased persons eugenic principles should be the guide in considering the advisability of children being born to them. Many other speakers regarded a diminishing birth-rate as a characteristic of all nations attaining a certain level of civilisation. It is inevitable, unless the economic conditions of a people become such that the new-born individual is sure to find its upbringing assured, and at present this is attained nowhere. The meeting passed a resolution which will be brought to the notice of all the authorities concerned and which sets forth that the present drop of the birth-rate is the direct outcome of the social and economic conditions now existing. It cannot be combated by law, but only by removing the underlying causes, and as long as these are effective contraceptive measures are more advisable than abortion, because the latter is always fraught with a certain degree of danger. The resolution further states that the meeting does not advocate free right to procure abortion unconditionally, but that it strongly favours a modification of the law in the light of medical and social contingencies.

THE Williams and Wilkins Company of Baltimore, U.S.A., announce the forthcoming of a book by Dr. John T. King, jun., of Baltimore, entitled Basal Metabolism, for the student and practitioner.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

The Local Government Bill.

THE anxiety of the medical profession of the Irish Free State as to the Pensions clauses of the Local Government Bill is not likely to be diminished by the speeches made by the Minister of Local Government in debate. If he is correctly reported (and the report is the same in more than one newspaper) he used the following words: "Medical officers at present carried on private practice as well as attending to their public duties, and notwithstanding this fact, they were allowed pensions. It was not considered desirable to continue that practice." If the words mean what they appear to mean, then it is only right to say that the Minister's wishes go far beyond what he has put in his Bill. In the Bill it is clearly laid down that part-time medical officers are pensionable. Some of the Minister's other contributions to the debate leave one uneasy as to his familiarity with problems of public health. The Bill provides for the appointment of whole-time medical officers of health in each county. Mr. Burke, in arguing for the necessity of this step, gave as one of his reasons that the county medical officer of health could act as medical inspector of school-children in his area. One need hardly say that under such conditions both the inspection of children and the public health work would be sterile. The profession and the public are fortunate in having in the Dail one who is so familiar with health problems as Sir James Craig, whose speeches in regard to the present Bill have been sound and constructive.

Inquiry into the Health Services of Ireland.

The first meeting of the Committee of Inquiry into the health services of the Irish Free State, appointed by the Minister of Finance, was held last week. The terms of reference are wide: (1) To inquire into and report on the advisability of the continued maintenance of the system of national health in its present form, and to make any recommendations which the committee consider proper in that connexion; (2) to consider whether it is desirable to institute a system of medical treatment on a contributary basis and, if so, to advise as to the form which such system should take; and (3) to examine into and report on the question whether the medical services at present assisted or maintained out of State or local funds can be improved as respects efficiency and economy and, if so, in what manner, due regard being had to any recommendations made under the preceding paragraph. Prof. W. Magennis is chairman of the committee; and the other members are Sir Joseph Glynn and Dr. W. J. Maguire, chairman and medical member respectively of the National Health Insurance Commission; Dr. Stephenson and Mr. Hurson, of the Ministry of Local Government; Mr. McElligott, of the Ministry of Finance; Mr. Kyd as Government actuary; Rev. Canon McHugh, and Dr. Robert J. Rowlette.

Public Medical Appointments and Competitive Examinations.

The practice of election of medical officers by local authorities throughout Ireland has often been the subject of criticism. At best the electors are likely to be swayed by ties of family and friendship, and at worst charges of bribery have been made. The Ministry of Local Government has just held a sworn inquiry into the circumstances surrounding a recent election of a medical officer in Co. Roscommon, in regard to which charges of bribery were openly made. It is refreshing, therefore, to find a local authority demanding a mode of appointment which would be free of all impurity. At a recent meeting of the Tipperary County Health Board (N.R.) a resolution was unanimously agreed to: "That all medical appointments of the County Health Board be made by competitive examination or selection; that the applicant who has been reported as possessing the highest professional qualifications and experience shall in all cases be appointed; that the Board of Health request the assistance of the Ministry of Local Government in giving effect to this resolution."

An Abortive Meeting of the Irish Medical Association.

It is a curious symptom of the apathy in which the medical profession of Ireland is at present steeped that the annual meeting of the Irish Medical Association summoned for June 12th had to be postponed for want of a quorum. The quorum is 20, and after waiting an hour there were still only 16 members present. The ordinary members of the Association, and of the profession at large, seem to have lost all interest in medical organisation at the very moment when a strong professional organisation is most needed. If the present inertia on the part of the profession continues, not only will medical interests be sacrificed, but, what is more important, the cause of health reform will suffer.

REPORT OF THE JOINT BOARD OF RESEARCH FOR MENTAL DISEASE.

A REPORT of work carried out during the year ending May, 1924, under the Joint Board of Research for Mental Disease, of which Sir F. W. Mott, F.R.S., is the honorary director, has been issued. A portion of the special grant of £400 made by the Board of Control, which was reserved for the investigation of the Basal Metabolism in Mental Disorder, has been expended in the construction of a respiratory chamber of a type similar to that used by Prof. J. S. Haldane and Dr. Graham at the University of Birmingham Mines Department, and about 160 gas analyses have already been made. The Research Board has founded a scholarship, valued at £250 per annum, for the investigation of the pathology of mental disease; Mr. Dennis L. Woodhouse, M.Sc., who has been appointed the first scholar, is undertaking an investigation into the effects of hypnotic drugs upon animals, more especially in relation to their growth and basal metabolism. Under the direction of Dr. F. A. Pickworth the bacteriological, biochemical, and morbid anatomy sections of the research laboratory have been equipped and associated with the clinical work of the hospitals. Over 600 bacteriological examinations have been made; agglutination reactions have been carried out, and the Bordet-Wassermann complement-fixation tests are now done in the laboratory. Other mental hospitals in the provinces, if they desire to avail themselves of the facilities of the research laboratories at Hollymoor, are invited to join the Research Board, when they can send material for investigation according to a given scale of charges. Under the supervision of the honorary director an investigation into the action of tryparsamide in early general paralysis is being made; up to the present six cases have received treatment. The utility of bismoxyl supplied by Prof. Levaditi is under trial at the Maudsley Hospital. Investigations have been instituted to ascertain the extent of the existence of chronic septic foci in cases of mental disorder; an attempt has been made to determine the character of the infections and to correlate them with morbid processes in other tissues. A preliminary communication on the results of the radiography of the bony structures of the head revealing evidence in some cases of deep bony infections associated with the jaws and nasal passages was submitted for discussion to the Medico-Psychological Association's meeting held in London, July, 1923, and was published in the *Journal of Mental Science*. This line of research is being continued. Recently the Birmingham guardians have become associated with the City and University of Birmingham in supporting the Research Board; and on behalf of their Monyhull Colony for Mental Defectives have made a contribution to the funds of the Board, enabling them to utilise the facilities of the research laboratory. They also have representation on the Board.

THE "Chesterfield" silver medal in dermatology at St. John's Hospital for Diseases of the Skin, Leicester-square, London, W.C., has been awarded to Dr. E. J. Tyrrell.

THE Chemists' Exhibition and Empire Drug Trade Mart will be held from June 23rd to 27th in the Central Hall, Westminster, London, S.W. The exhibition will be open each day from 11 A.M. till 8 P.M.

Correspondence.

"Audi alteram partem."

THE SIMMINS APPEAL FUND.

To the Editor of THE LANCET.

SIR,—The final list of donations to this fund brings it to the gratifying total of £1315 6*s*. 4*d*.; the fund is now closed.

The committee which was formed to issue the appeal held several meetings and carefully discussed how best the money subscribed could be utilised. It was unanimously resolved that the interests of the children would be best served by spending the money entirely upon their education. A capital sum of £1250 was accordingly paid to the Commercial Union Assurance Company in return for which a series of policies for each of the two children has been issued whereby for a period of ten years each child will receive a sum of £85 12*s*. 6*d*. per annum from the time it reaches the age of 9 years. After negotiations with the Royal Medical Benevolent Fund and with the kind coöperation of the hon. secretary, Dr. Newton Pitt, who has keenly interested himself in the matter, the committee is happy to report that the Royal Medical Benevolent Fund has agreed to administer, in conjunction with Dr. Nabarro, the monies payable under the said policies, and to apply the same, as and when received, for the education of the children. It is fortunate for the children that the Royal Medical Benevolent Fund is thus interested in them, because the members of the Ladies' Guild will no doubt also help the relatives to look after their well-being. Of the balance of the money collected—namely, £65 6*s*. 4*d*.—the sum of 3 guineas has been paid in connexion with the legal expenses incurred by the Royal Medical Benevolent Fund, leaving a sum of £62 3*s*. 4*d*., which has been handed over to the relatives.

In conclusion, we should like to add that we are very grateful to all those, both in and out of the profession, who have so kindly interested themselves in the case, either by contributing to the fund or by their offers of adoption. In particular we would thank Mr. Herbert Semon and Mr. James Stobart who were able to secure for the fund £106 14*s*. and £31 15*s*. from members of the Stock Exchange and Lloyds respectively. Mention should also be made of the generous donations received from past and present members of Dr. Simmins's old schools at Westminster and Guy's Hospitals. Our thanks are also due to you, Sir, for the gift of valuable space, for without such coöperation the necessary publicity could not have been given to this deserving case.

We are, Sir, yours faithfully,

W. HALE-WHITE,
Chairman of the Appeal Committee.
H. C. SEMON,
Treasurer.
DAVID NABARRO,
Secretary.

Final List of Subscriptions to the Simmins's Appeal Fund.—Anon (Amara, Mesopotamia) and H. R. Leach, £10 each; J. B. Smith, £3 3*s*.; Dr. Petrie, £2 12*s*. 6*d*.; Cash, £2 2*s*.; J. B. Russell, £1 1*s*.

LEAD AND CANCER.

To the Editor of THE LANCET.

SIR,—The reply to Prof. E. L. Collis's comments (THE LANCET, June 14th, p. 1239) on my recent address, which is reviewed very fairly in your leading article (June 7th), is contained in the address in question (*Public Health*, June, 1924, p. 217). I would suggest that Prof. Collis do me the honour of reading it, for evidently he had not done so when he wrote his letter. I refrain from taking advantage of so obvious a controversial gift. I would, rather, ask the assistance of Prof. Collis in arriving at the truth, which can only be reached along the lines indicated in my address.—I am, Sir, yours faithfully,

June 14th, 1924. W. BLAIR BELL.

ENCEPHALITIS LETHARGICA AND NASAL DOUCHES.

To the Editor of THE LANCET.

SIR,—In THE LANCET of June 7th, p. 1175, there is printed the section of the Memorandum on Encephalitis Lethargica issued by the Ministry of Health giving, amongst other directions, some "Precautions against Infection." Here it is suggested that—

"those in contact with the case may be advised to use antiseptic nasal sprays or douches and to gargle the throat with solutions such as those advised for influenza. For example, any of the following: 1. One per cent. solution of peroxide of hydrogen. 2. A solution of permanganate of potash, 1 in 5000, in 0·8 per cent. solution of chloride of sodium (common salt). 3. Liquor sodæ chlorinatæ, 0·5 per cent."

Now, when this Memorandum suggests that "these solutions can be used as ordinary throat gargles," I do not think anyone can object to their use. They may certainly be helpful in cleansing and disinfecting the mouth and pharynx—cavities which are only able to protect themselves against bacterial invaders and their products either by expectorating them or by swallowing them into the stomach. There is nothing in the three suggested remedies to damage the mucosa of the mouth and pharynx. But a very different question is raised when it is advised that they should be "snuffed up the nostrils or applied by an efficient spray." The nasal cavities in health are very sensitive and highly organised chambers. The ordinary nerves of sensation, with which they are freely supplied, resent any irritating liquid and any antiseptic, except in such a weak solution as to be useless. The olfactory nerves are readily deteriorated by the use of any but warm, alkaline lotions, isotonic with the blood, and if they are benumbed one of the defensive mechanisms of the nose is weakened. The much more important defensive arrangements supplied by the normal mucus of the Schneiderian membrane, the ciliated epithelium, and the delicate mechanism of the turbinal bodies would all be interfered with by using any of the three suggested solutions as a nasal douche or spray. It is nearly 30 years since Prof. R. T. Hewlett and myself demonstrated that the interior of the healthy nose is a sterile cavity, that the nasal mucus in health is inhibitory to bacterial growth, and that the ciliated epithelia are active and never resting "chuckers-out" of any invaders.

The practical application of these researches is shown by the general disposition of rhinologists to abstain, when possible, after operation, from the use of powders, antiseptics, or plugs in the nose. An antiseptic, to be of any bactericidal value, would have to be of such a strength that it would produce a quite intolerable irritation of the nasal mucosa. Where milder antiseptics have been used, and benefit has been claimed from them, any good effect has doubtless been due to the stimulation of an increased flow of mucus. In conditions of disease, such as ozæna and syphilis, where the sense of smell, the ciliated epithelia, and the turbinal bodies have been all more or less destroyed, the circumstances are different. The nose is then a septic cavity, its sensitive and defensive mechanism are lost, and stronger antiseptics can be used with benefit. During previous influenza epidemics I have seen several cases of damage to the middle ear, and to the accessory sinuses, in patients who had taken their advice from the daily press and had been sniffing Condy's fluid up their nostrils.

It would be well, therefore, if the Ministry of Health's recommendations limited the use of these three lotions to their employ as gargles and mouth washes. The healthy nose provides for its own sterility, and this cannot be improved on. Blowing is all that is required for cleansing it of used-up mucus. If the nose falls below a standard of health—becoming either catarrhal or stenosed—it can be assisted, without harm, by using warm, alkaline lotions, isotonic with the blood. The simplest and

readiest is normal saline solution. Others can be made by dissolving 10 gr. of borax or 6 gr. of soda in an ounce of water. Or several of these alkalis can be mixed together and prescribed in the strength of 5 gr. to the ounce. A little white sugar or glycerine or a mild antiseptic (menthol, sanitas, thymol, and the like) in a minute dose may be added to give a pleasant flavour. But all antiseptics are irritating to the nasal mucosa; in a normal nose they are useless and in efficient strengths they are harmful.

I am, Sir, yours faithfully,

STCLAIR THOMSON.

Wimpole-street, W., June 11th, 1924.

"INDUCTION" OR "CAUSE" OF CANCER.

To the Editor of THE LANCET.

SIR,—My letter to you induced Dr. Archibald Leitch to answer it. The cause of his answer depended upon his agreement or disagreement with me and included the states of his hereditary history, digestion, nervous and vascular systems, to say nothing of his internal secretions. The middle of the first paragraph of his letter contains a sentence which shows he really agrees with what I wrote. I recognise this with great relief and pleasure, because it induces me to believe that the complicated physiology of my learned friend is normal. The diphtheria bacillus can induce in the same individual such opposite effects as diphtheria and immunity thereto, the causes of which are wrapped up in the mysteries of susceptibility and immunity respectively, by which subjects much labour has been induced.

I am, Sir, yours faithfully,

G. LENTHAL CHEATLE.

Harley-street, W., June 13th, 1924.

To the Editor of THE LANCET.

SIR,—May I be allowed to endorse the view expressed by Sir Lenthal Cheatle in his letter on this subject in your issue of June 7th? I would particularly comment upon the following sentence: "It will be well to realise that factors that induce carcinoma belong to a quite different category from those that cause it." I think this is a timely reminder in view of a tendency noticeable at the present time to search for the causes of cancers. (I use this term to include both carcinoma and sarcoma.) My own view, in which I do not think I am by any means alone, is to consider cancer as a specific disease, which has a specific cause. Surely the predisposing factors cannot be regarded as the actual cause? Apart from some known or probable inducing factors, such as tar, soot, certain oils, pipe-smoking, betel-nut chewing, the kangri-custom, to mention only a few, there must be very many others if we are to account for all forms of cancer, of which those induced in the above-mentioned ways constitute only a minute proportion. It seems to me, were the manifold predisposing factors all known, we should scarcely dare to live, lest, by failing to avoid any one of them, the actual cause might be set up.

Four years ago, in the course of a leading article[1] on the Cause of Cancer, it was said: "Adami is more in line with modern conceptions of the cancer process as a profound alteration of cell metabolism when he ascribes malignant disease to an alteration in the activities of the cell, whereby function" (i.e., its specialised function) "becomes lost and only the power of growth remains." That is it; a fundamental alteration in the vital activity of the cell, which *may* be set up (or may *not* be set up; in the great majority of natural cases it all depends on the vital condition of the cell) by any one of various inciting or accessory factors. A long time will probably elapse before we understand the real nature and reason of this pronounced—yet, in my view, not really so remarkable—change in the mode of life of *certain individual* cells of a particular type. May I say that I think efforts might be more concentrated on ascertaining in what different manner a cancerous cell is behaving from a normal one. What is the characteristic and essential *expression* of its altered metabolic activities?

In the first place, the great thing to bear in mind is that the tissue cells are little *animals*—homologues of the unicellular protozoa. I know, of course, that this is generally regarded as the only reasonable and logical view to take; but I think this point is too much taken for granted, without attention being sufficiently paid to the important consequences that follow. And I think protozoologists should do all in their power to emphasise this homology, because of its bearing on progress towards understanding the nature of many of the diseases of still unknown causation. For nearly four years I have been trying to show that tissue cells ingest and (or) digest solid, organised nutriment, notably red blood corpuscles, but also cells. They do this both normally and in pathological conditions. I have termed this behaviour hæmatophagy and hæmetaboly. Normally, this function is exercised for the welfare of the body as a whole, and results in the production of various substances of the nature of "secretions" or "excretions." When a particular type of cell becomes deranged by the action of a ferment-virus, abnormal alteration of the blood elements results and various well-known and characteristic bodies and granules are produced. Ultimately, too, the cells themselves break down, when more bodies and granules are produced as a result of karyolysis.

In cancer, I think something quite different occurs. The vital alteration of the cancerous cell is such that it takes to metabolising and utilising the blood elements *for its own growth and proliferation*, instead of performing this function for the well-being of the body as a whole. In other words, this is a modification of Dr. Charles Creighton's view; and I would venture to draw the serious attention of others to this hypothesis. What is urgently required, I think, is more light on the question of the blood-digestive enzymes of tissue cells, and of the cell antibodies to such enzymes.

I am, Sir, yours faithfully,

London, June 13th, 1924. H. M. WOODCOCK.

[1] THE LANCET, 1920, ii., 705.

"CONSTRUCTIVE CONSCIOUS CONTROL OF THE INDIVIDUAL."

To the Editor of THE LANCET.

SIR,—It is evident that your reviewer (THE LANCET, May 17th, p. 1007) has misunderstood, and consequently unwittingly represented my work, in that he has suggested that my conclusions, as set forth in the book with the above title, are those of an "intuitionalist" rather than the result of concrete procedures. I wrote in the preface, "I intend, in this volume, to adhere to my earlier scheme of practical illustration, endeavouring, as far as possible, to give a *demonstrable* illustration in connexion with statements and arguments," and I here repeat that I should have great pleasure in demonstrating to your reviewer the practical working of any of the principles which I advocate. I am certain that you are anxious that THE LANCET should be a medium for making known the truth from whatever source it comes, and that you will not be prejudiced against me because I am merely a layman.—I am, Sir, yours faithfully,

F. MATTHIAS ALEXANDER.

Ashley-place, Westminster, S.W., June 13th, 1924.

MEMORIAL TO THE LATE PROF. PETER THOMPSON.

To the Editor of THE LANCET.

SIR,—A movement has recently been initiated among the students of the late Prof. Peter Thompson to provide some memorial in the University of Birmingham of his work as professor of anatomy from 1909 to 1921. It has been suggested that his many friends and old pupils in Manchester and London would be glad of an opportunity of helping to keep his memory

green. A general committee has been formed and it is proposed to raise a fund to be called the "Peter Thompson Memorial Fund." The ultimate decision as to the form of the memorial should take will depend on the amount which is subscribed, but the general feeling appears to be that the foundation of an annual prize in anatomy would be appropriate. A circular letter has been sent out, but we feel that many who would like to contribute to this fund may have been overlooked.

Subscriptions should be sent to either of the secretaries of the fund at 52, Newhall-street, Birmingham, and cheques made payable to the "Peter Thompson Memorial Fund" and crossed Lloyds Bank.—We are, Sir, yours faithfully,

JAMES C. BRASH,
Chairman.
LEONARD G. PARSONS,
HILDA N. SHUFFLEBOTHAM,
Hon. Secretaries and Treasurers.

THE PSYCHOLOGY OF SEA-SICKNESS.

To the Editor of THE LANCET.

SIR,—Will you kindly permit one who has spent much of his life afloat, commencing in a troopship at the age of a few months and only severing his connexion with the sea after some 17 years spent in all manner of craft, from destroyers and cruisers to battleships and liners, to offer a few observations on the psychology of sea-sickness. Dr. W. H. B. Stoddart is of the opinion that "sea-sickness is always of psychical origin." I confess to being mystified by this statement. "Psychical" is the adjective of "psyche," and by the latter I presume he means "mind." Now "mind" is an abstraction, a *mot de convenance* for the innumerable and multifarious *processes* taking place in brain substance, more especially, probably, in the cortical association areas. Sea-sickness, in my opinion, originates in "things" and not in "processes." Had Dr. Stoddart expressed the opinion that sea-sickness originates in the brain, one could, at any rate, even if disagreeing, have understood what he meant, but to maintain that it originates in a "psyche" is to confuse an abstract function with a concrete substance.

My acquaintance—longer than I care to think of—with this distressful malady as experienced in myself and exemplified in others convinces me that the only rational way to consider it is from a standpoint that regards the organism and the enviroment as an interconnected whole. If the relationship existing between the organism and environment be disturbed in a certain manner sea-sickness ensues. The ultimate origin of sea-sickness is obviously extra-organismal. The peripheral sense-organs convert environmental stimuli into centripetal nerve impulses which, streaming inwards by different routes eventually—that is, after integration and coördination by the cortical neurons—give rise to certain sensations, states of consciousness, and centrifugal nerve impulses that characterise the giddiness, nausea, faintness, sweating, retching and vomiting, &c., of sea-sickness. It is failure on the part of the organism correctly to interpret the resulting coördination of the several streams of nerve impulses flowing cerebropetally from the end-organs of orientation and movement that constitutes the basis of sea-sickness. The unpleasant sights, sounds, and smells, the stuffy, over-heated and vitiated air, incidental to a sea voyage in rough weather, are but powerful contributory factors. Short of stepping ashore and stopping ashore there is only one cure for sea-sickness, and that is adjustment of the conflicting impressions by the brain—adaptation. Under normal conditions the senses of orientation and movement, as derived from nerve impulses originating in the muscles, articular surfaces, in the walls of the otolith organ and semicircular canals, receive confirmatory evidence from corresponding nerve impulses emanating from the organs of vision. In sea-sickness the ingoing messages are utterly contradictory—in short, eye belies ear. Deaf-mutes, in whom the otolith organ is defective or absent, cannot be made giddy by forcible rotation, and are stated to be practically exempt from sea-sickness. There is, again, the evidence afforded by the "phantom swing." This is an apparatus that looks exactly like an ordinary swing attached to the ceiling of a room. In reality it is attached to an axis around which the whole room is capable of rotating; the "swing" itself never moves. When the room is oscillated about the sitter through a gradually increasing arc, the impression he receives from the eye are those of being himself swung, but these impressions are in conflict with those from his other organs of balance and movement (the semicircular canals and otolith receptacle) which are transmitting "messages" to the effect that he is not in motion. This confusion of the sensorium not infrequently results in giddiness, nausea, and even vomiting.

Dr. Stoddart believes that the rise and fall of a boat during a sea-voyage tends to remind certain people "in an unconscious way" of "the respiratory rise and fall of the mother's breast" when, as infants, they were being suckled, and that the sea-sickness with its rejection of food is a mode of repressing this infantile memory. He disposes of the objection that artificially fed infants also grow up into individuals prone to sea-sickness with the explanation that these were either nursed against the mother's breast whilst sucking their feeding-bottles, or else this was "supplemented or replaced by jigging the child to and fro or up and down, cradle-rocking, swinging, and so forth." Possibly, too, their "oral libido" was at too high a potential. May I ask him whether he would further stretch this already severely strained and far-fetched theory so as to include lower animals, such as dogs, who are frequently sea-sick, but who are not, as in the case of the human infant, suckled at pectoral mammæ, nor "jigged," nor "cradle-rocked," and who have no thumbs of their own nor fingers of a nurse to increase their "oral libido"?

It is questionable if those who go down to the sea in ships will gather either sense or comfort from Dr. Stoddart's remarkable assertion that his "explanation of sea-sickness will never cure a patient suffering from it. To be effective, he must discover the explanation for himself, out of his own mind." There are a goodly number of vaunted cures for *mal de mer*, most of them harmful, all of them useless, but an explanation out of one's own mind is a distinct novelty in the way of nostrums.

I am, Sir, yours faithfully,
C. MARSH BEADNELL,
Surgeon Rear-Admiral, R.N.

Chatham.

HYPERGLYCÆMIA AND GLYCOSURIA IN ACROMEGALY.

To the Editor of THE LANCET.

SIR,—In the paper by Dr. A. W. M. Ellis, published under the above heading in your issue of June 14th, no allowances have been made for the variations in the concentration of the blood that appear to take place after a meal in cases where there are disturbances of the functions of the pituitary. Possibly the apparent diminution of carbohydrate tolerance after the operation shown in this case by the percentage of sugar in the blood may be partly accounted for by variations in the blood volume resulting from the test-meal. With reference to the theory Dr. Ellis advances to explain the glycosuria of acromegaly, I may say that the metabolic experiments on animals upon which Mr. H. A. H. Howard and I are at present engaged have given results which tend to support his view, for they suggest that pituitrin is chemically antagonistic to insulin, and that, unlike adrenalin, it does not produce its effects on carbohydrate metabolism by directly influencing the formation of sugar from stored carbohydrate in the body, but by preventing the action of insulin in that direction.

I am, Sir, yours faithfully,
P. J. CAMMIDGE.

Nottingham-place, W., June 16th, 1924.

THE VALUE OF ARC-LIGHT BATHS.

To the Editor of THE LANCET.

SIR,—We have recently been extending here the application of the general arc-light bath, which has been proved useful by Reyn, Sequeira, and others, using a powerful long-flame arc, rich in ultra-violet rays, and exposing the back and front of the body in turn, at first for 5 and finally for 30 minutes, three or four times a week. Such baths notably put up the hæmobactericidal power of the blood, as tested in vitro (Colebrook, Eidinow, and L. Hill). Not only cases of surgical tuberculosis—e.g., a tuberculous hip—and cases of lupus have benefited very considerably from such baths, but also several women, of sedentary indoor occupation, who were suffering from sciatic or "rheumatic" pains, and were generally feeling run down in health. There has also been much benefited a case diagnosed on reasonably sure grounds (X ray evidence, &c.) as one of duodenal ulcer. This man had not been benefited by dietetic treatment, and an operation was discussed.

Perhaps the most interesting and surprising case was that of a man, aged 54, suffering from high blood pressure (220 mm. Hg systolic), breathlessness on climbing stairs, fainting attacks, frequent headaches for three years, and irritability. He had no signs of syphilis or renal disease, and had been previously treated in accordance with the best current medical opinion. Thus, he ate little meat and generally restricted his diet, neither smoked tobacco nor drank alcohol, gently exercised himself in the open air, and had hot baths. Nevertheless, his symptoms had continued unabated. After starting the arc-light baths his headaches vanished, and now, after two months, his symptoms have all gone, together with about 2 st. of his over-weight, his systolic pressure has fallen to 175, and he feels a different man.

Another striking case is that of a girl 16 years of age, ill in health, with approximately a 50 per cent. increase of lymphocytes, diminished polymorphs, a few myelocytes in her blood, the hæmoglobin down to 74 per cent., the abdomen somewhat distended, and a few glands in the right iliac fossa. While some grave disease of the blood-forming organs was considered possible, a doubtful diagnosis of tuberculous peritonitis was made. This girl, together with her blood, has been put into healthy condition by a two months' course of general arc-light baths.

Our daily measurements of ultra-violet radiations, taken with the acetone-methylene-blue gauge, have shown us the great loss of these rays in our cities compared with the open country. By indoor occupations and amusements, by screens of glass, smoke, and clothing, people cut themselves off almost entirely from the ultra-violet rays which in the winter in our climate are naturally weak. The vast metabolic organ formed by the living cells of the epidermis is removed from its natural stimulus—sunlight and open air. Hence, the very great benefit given to a variety of sickly people by arc-light baths. We predict that in two or three years the taking of such baths will become general as a winter pick-me-up.

We are, Sir, yours faithfully,

ALBERT EIDINOW.
LEONARD HILL.

National Institute for Medical Research, Hampstead, London, N.W., June 17th, 1924.

BRITISH ORTHOPÆDIC ASSOCIATION.—The Association offers a prize of £50 and a medal to be given by Sir Robert Jones for an annual competition amongst members of the association of all grades for an essay on a subject in orthopædic surgery. The subject of the essay for 1924 is the Diagnosis, Treatment, and End-Results of Tuberculous Disease of the Hip-joint. The subject of the essay for 1925 is the Classification and Differential Diagnosis of the Different Forms of Arthritis. The essay is to be submitted typewritten, together with any illustrations and specimens, and forwarded to the Secretary, at 1a, Portland-place, W., on or before Dec. 31st in each year. It must not bear the name of the writer, but should be identified by a motto.

Obituary.

ROBERT BRUCE FERGUSON, M.D. CAMB., D.P.H.

Dr. Ferguson, who died at Surbiton on June 10th, was educated at Cambridge University and St. Mary's Hospital; at the former he graduated in arts and medicine, taking his M.D. in 1895. After qualifying he devoted himself for some time to ophthalmology, holding appointments as house surgeon at the Royal Westminster Ophthalmic Hospital, and clinical assistant at the Royal London Ophthalmic and St. Mary's Hospitals. Later he settled in New Southgate, where in addition to general practice he did ophthalmic work, his knowledge in that branch being much appreciated by his fellow practitioners. He was on the staff of the Passmore Edwards Hospital, Wood Green, and for a time chairman of the council. Dr. Ferguson was author of a useful little book entitled "Aids to the Mathematics of Hygiene," which went through five editions, and he contributed papers on diplopia and vertigo to medical journals. Latterly he had been living in retirement at Epping. He leaves a widow, three daughters, and a son, who with a large circle of medical and other friends will mourn their loss.

RICHARD EMMETT, M.D. DURH., M.R.C.S. ENG.

BY the death of Richard Emmett on June 8th Portsmouth loses one of its best-known public men, and a prominent and much-loved medical practitioner of the older school. Born in 1858 of good West country stock, he received his medical education at St. George's, and after qualifying in 1885 settled down to practise in Portsmouth. Here he quickly established a reputation, not only for professional skill and devotion, but for an ever-ready practical sympathy with all forms of distress. In the days when the standard of Poor-law nursing was low he offered himself as a candidate for the board of guardians with the object of raising that standard and securing the provision of a properly trained nursing staff. In this he was successful, in spite of opposition. He subsequently joined the town council, of which he remained a member for many years. He took an active part in the management of the Royal Portsmouth Hospital. Dr. Emmett was a keen Territorial officer, rising in 1914 to the rank of Lieut.-Colonel, R.A.M.C. It was overwork with his duties as senior medical officer in the district during the war years, in conjunction with the heavy calls of a large general practice which apparently brought on the serious cardiac condition which has now proved fatal. Dr. Emmett was made a J.P. in 1915. He was a man who touched life at many points, was a loyal friend, and a kind and sagacious physician.

CLARENCE ALFRED JOSEPH WRIGHT, F.R.C.S. EDIN., F.R.F.P.S. GLASG.

Mr. C. A. J. Wright, of Leytonstone, who died last month in his fifty-ninth year, was a son of Dr. Arnold Wright, surgeon to the Rajah of Mysore. He was born in India and studied medicine in Madras, where at the Presidency Medical College he acted as demonstrator in anatomy. Later he went to Edinburgh and continued his studies at the Royal College of Physicians, obtaining the triple qualification L.R.C.P. & S. Edin. and L.R.F.P.S. Glasg. at the age of 23, and was admitted to the Fellowship of these bodies in 1898. Mr. Wright settled in Leytonstone about 26 years ago after some experience of practice in Rochester. He held several appointments in connexion with shipping and insurance companies and was certifying factory surgeon. He became a keen student of medical electrology and of nervous affections, and was for a time associate editor of *Medical Electrology and Radiology*. He was also editor of the *Archives of Rontgen Ray and Treat-*

ment. He wrote several treatises on electro-medical subjects; in 1904 he published an English translation of Freund's "Radio-therapy" and the following year, in the Transactions of the British Electro-Therapeutical Society, an article on Electrical Methods of Local Medication. He also contributed to *Treatment* an article on the Physiological Aspects of Radio-therapy Effects of Radiation upon the Immunising Powers of the Blood. Among his contributions to THE LANCET there appeared in 1904 several letters deprecating the practice of electro-medical treatment by lay persons.

EDWARD CHICHESTER, M.B. LOND.

Dr. E. Chichester, who died recently at Colchester, in his fifty-ninth year, after a long and painful illness, was a well-known East Sussex medical practitioner and honorary surgeon to the Essex County Hospital, of which he was also vice-president. He was educated at Friar Park, Bath, and studied medicine at the London Hospital, qualifying M.R.C.S. and L.R.C.P. in 1891 and M.B. three years later, with honours in anatomy. He subsequently held appointments as house surgeon and resident accoucheur at the London Hospital, and was clinical assistant at the Royal London Ophthalmic Hospital. In his younger days Dr. Chichester was an enthusiastic sportsman and a keen traveller. He was a descendant of the ancient family of Chichester, of Caverleigh, Devon, and was the fourth son of Captain Nugent Chichester. He is survived by a widow, two sons, and a daughter, to whom we extend our sympathies.

Medical News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—At a meeting of the Council of the College, held on June 12th, Sir John Bland-Sutton, President, in the chair, Dr. Arthur Robinson, professor of anatomy, University of Edinburgh, was introduced and after signing the by-laws was admitted a Fellow of the College.—The secretary reported the death of Prof. Samuel George Shattock, F.R.S., pathological curator of the museum, and the following vote of condolence was passed:—

The Council hereby express their deep regret at the death of Prof. Samuel George Shattock and their sincere sympathy with Mrs. Shattock and the members of her family in their bereavement. In doing so the Council desire to place on record their high appreciation of Prof. Shattock's services to the College as pathological curator of the museum during 27 years, and they believe that the great collection of pathological specimens, to which he devoted such care and attention, will stand as a lasting memorial of his skill and knowledge. His wide experience, sound judgment, and accuracy of observation made him pre-eminent as a surgical pathologist in this country, and his loss will be greatly felt not only at this College, but also by many members of the profession who sought his advice and opinion.

The following gentlemen were elected examiners for the ensuing collegiate year in the subjects indicated:—

Diploma of Fellow.—Anatomy: Messrs. W. E. Le Gros Clark (St. Bart.'s), W. F. Haslam (Birmingham), F. G. Parsons (St. Thomas's), and William Wright (London). Physiology: Messrs. David H. de Souza (King's Coll.), J. Beresford Leathes (Sheffield), John Mellanby (St. Thomas's), and Ffrangcon Roberts (Cambridge).

Conjoint Board.—Elementary Biology: Messrs. J. P. Hill (Univ. Coll.) and T. W. Shore (St. Bart.'s). Anatomy: Messrs. Henry A. Harris (Univ. Coll.), David Hepburn (Cardiff), and Oscar S. Hillman (Middlesex). Physiology: Messrs. George A. Buckmaster (Bristol) and C. A. Lovatt Evans (St. Bart.'s). Midwifery: Messrs. Eardley Holland (London), C. Hubert Roberts, Donald W. Roy (St. George's), and H. Beckwith Whitehouse (Birmingham).

Sir Berkeley Moynihan was re-elected a representative of the College for the ensuing three years on the Court of Governors of the University of Sheffield.

As the result of the Final Fellowship Examination, held from May 22nd to June 5th, for which 96 candidates presented themselves, 24 candidates were approved. Four of the successful candidates (Arthur John Gardham, John Percival Hosford, Laurence Frederick O'Shaughnessy, and Frederick Hector Scotson) have not yet attained the requisite age and will not receive the diploma until a later date. The Diploma of Fellow was therefore conferred upon the following 20 candidates:—

William S. Adams, Birmingham and London; Edward P. Brockman, Cambridge and St. Thomas's; Digby Chamberlain, Leeds; Joseph M. Craig, St. Andrews and Guy's; Cecil A. Horder, St. Bart.'s; Philip J. Jory, Otago and St. George's; Cyril A. King, Otago; Reginald C. B. Ledlie, Guy's; Robert C. B. Macrae, Edinburgh and London; Ida C. Mann, Royal Free and St. Mary's; Alan E. Park, Otago and London; Vithaldas L. Parmar, Bombay and Guy's; Conrad V. Patrick, Cambridge and St. Thomas's; Gordon H. Pfeiffer, Sydney, Middlesex, and Guy's; Esther Rickards, St. Mary's; Allan Seddon, Liverpool and London; Harold G. Taylor, Cambridge and St. George's; Arthur H. C. Visick, St. Bart.'s; William R. Williams, Liverpool; and Edric F. Wilson, Guy's.

CAMBRIDGE MEDICAL GRADUATES' CLUB.—A dinner of this club will be held on Friday, June 27th at 7.30 P.M., at Cambridge, in Trinity College. Any member who wishes to be present is asked to inform the Secretary, Mr. W. H. C. Romanis, F.R.C.S., 31, Harley-street, W. 1, as soon as possible.

MEDICO-PSYCHOLOGICAL ASSOCIATION.—The eighty-third annual meeting of the Medico-Psychological Association of Great Britain and Ireland will be held on July 1st, 2nd, 3rd, 4th, and 5th, under the presidency of Dr. M. J. Nolan, at the Medical Institute, College-square, Belfast, and Queen's College, Belfast. On July 1st Dr. F. R. Martin will read a paper entitled the Reaction of the Blood to the Ingestion of Protein in the Psychoses. On July 2nd, after a business meeting, a paper will be read by Dr. T. Houston on the Examination of the Cerebro-spinal Fluid, to be followed by two short papers read by Dr. W. Calwell: (1) The Unconscious, a Suggestion; (2) Short Notes on a Case of Cerebral Sanguineous Cyst with Mental Symptoms following Surgical Relief. In the afternoon the presidential address will be delivered by Dr. Nolan, and a visit will be paid to Purdysburn Villa Colony. On July 3rd, in the morning, a paper will be read by Dr. A. T. Hobbs, of Toronto, entitled a Survey of American and Canadian Opinion as to Focal Infections as Causative Factors in Functional Psychoses. Dr. R. Marshall will contribute some notes on Encephalitis Lethargica, and Prof. G. M. Robertson will read a paper entitled Is Dementia Præcox a Definite Clinical Entity? Demonstrations and pathological specimens will be on view. In the afternoon a paper will be read by Dr. Chalmers Watson entitled Further Reflections on the Rôle of Auto-Infection in the Ætiology of Acute and Chronic Mental Disorders, and in the evening the annual dinner of the Association will be held. On July 4th a visit will be paid to Downpatrick Asylum. At 11.30 A.M. Sir Frederick Mott will read a paper entitled the Thyroid Gland in Bodily and Mental Disease, to be followed by a paper by Dr. W. R. Dawson on the Work of the Belfast War Hospital, 1917–19. For July 5th various excursions have been arranged. The Maudsley Lecture nominee for next year will be Dr. Shaw Bolton.

OXFORD OPHTHALMOLOGICAL CONGRESS.—The fifteenth annual meeting will be held on July 3rd, 4th, and 5th, Sir Anderson Critchett, the Master, presiding. The Congress will be opened with an address of welcome by the Master at 10.30 A.M. on July 3rd, and at 10.45 a discussion on the General Principles of the Treatment of Convergent Concomitant Strabismus will be opened by Dr. E. Landolt and Dr. E. Thomson. Those taking part include Dr. G. E. de Schweinitz, Mr. T. Harrison Butler, Mr. R. Beatson Hird, Mr. Ernest Clarke, Mr. A. F. MacCallan, Mr. Claud Worth, Mr. Angus MacGillivray, Dr. Stewart Barrie, and Dr. Marion Gilchrist. The annual general meeting will afterwards be held. The afternoon will be devoted to demonstrations in the Scientific and Commercial Museums. At 7.45 P.M. the annual dinner of the Congress will be held in the Hall of Keble College. On July 4th, at 10 A.M., Dr. Howard F. Hansell will describe Four Cases of Atypical Retinitis Pigmentosa Associated with Developmental Abnormalities and Occurring in Members of One Family, and Dr. Harry Friedenwald will discuss: (1) Retinal Vascular Changes in Young Persons, Associated with Various Retinal Diseases; (2) Relation of Chorio-Retinitis Juxtapapillarie (Jensen's Disease) to Other Forms of Chorio-Retinitis. At 11, the Doyne Memorial Lecture will be delivered by Mr. T. Harrison Butler, the subject being Focal Illumination of the Eye with Special Reference to the Clinical Use of the Gullstrand Slit-Lamp. At 12.15 P.M., Dr. F. Park Lewis will speak on Preventive Ophthalmology as an Organised Movement. The remainder of the afternoon will be spent at the Eye Hospital, when demonstrations with Corneal Microscopes and Gullstrand slit-lamps will be given by Mr. Harrison Butler, assisted by Mr. R. J. Coulter, Mr. B. Cridland, and others. On July 5th, at 10 A.M., Mr. H. H. Joy will read a paper on Ophthalmology from a Legal Aspect. Demonstrations in the Scientific Museum will be given by Dr. George Young, Dr. Rayner D. Batten, Dr. Thomson Henderson, Dr. H. M. Traquair, Mr. J. H. Tomlinson, Mr. A. H. MacCallan, Mr. P. H. Adams, Mr. T. Harrison Butler, Dr. Arthur Greene, and Miss R. Millauro.

POOR-LAW MEDICAL OFFICERS' ASSOCIATION.—This Association will hold its annual meeting at the British Medical Association, 429, Strand, London, W.C., on June 26th, at 3 P.M., when Sir Arthur Newsholme, the president, will deliver an address.

MEDICAL GOLFING SOCIETY.—The annual summer meeting was held at the Sunningdale Golf Club on June 12th. In spite of the bad weather 77 members took part in the tournament. All play was on the old course. The results were as follows: THE LANCET Cup: H. Gardiner-Hill (scratch) 78, 1 up on bogey. Henry Morris Cup: W. R. Bristow (4), 2 up. Class I.: 1st, E. Ravensworth Hart (9), all square; 2nd, C. E. Finny (7), 1 down. Best last nine holes: Sir R. Cruise (2); W. H. Lamplough (1), 1 up. Class II.: 1st, Murray Thomson (10), all square; 2nd, G. Norman (10); C. Gregory (15), 2 down. Best last nine holes: L. Lack (13), J. Bright Banister (18), all square. In the Foursomes the following three couples tied for 1st place at 3 down: E. R. Hart (9) and H. W. Carson (15); G. Sutherland (8) and B. Hamilton (12); M. Page (5) and W. R. Bristow (4).

AN ITALIAN MEDICAL JOURNEY.—A medical tour to the main spas of Italy has been organised by the Italian State Tourist Department (known as the E.N.I.T.) and will take place from Sept. 18th to Oct. 3rd next, under the guidance of Prof. Guido Ruata, M.D., General Secretary of the E.N.I.T. The following spas will be visited: Acqui, S. Pellegrino, Levico, Vetriolo, Roncegno, Salsomaggiore, Bagni di Montecatini, Monsummano, Chianciano, Fiuggi, Agnano. At each spa visited a lecture will be given to illustrate its medicinal qualities, followed by visits to the establishments. The lectures will be delivered in Italian by a medical authority of the station, and copies in French, English, and German will be supplied to the visiting doctors. Doctors to act as interpreters in French, English, and German will accompany the tour. The party will be limited to 200, and the tour is intended solely for members of the medical profession; a certain limited number of tickets, however, will be available for relatives of the participants. The complete charge of the tour is fixed at 1600 lire, including first-class travel and hotel expenses from the starting point at Milan to the conclusion at Naples. The participants will also benefit by a reduced fare from the Italian frontier to Milan—valid from Sept. 6th, and from Naples to the frontier—valid up to Oct. 20th. The application list will be closed when the total of 200 has been reached, and not later than July 31st under any circumstances. Full particulars and application forms may be obtained from the Travel and Tourist Office of the E.N.I.T., 12, Waterloo-place, Regent-street, London, S.W. 1.

PUBLIC HEALTH: THE BORDEAUX CONGRESS.—The congress held at Bordeaux by the Royal Institute of Public Health during and after Whitsuntide was characterised by the practical nature of the communications that were read. In the section of general State medicine and in that of the special hygiene attaching to military and air service, admirable opportunities were given for close comparison between British and French methods, while the interchange of experiences in industrial medicine was fruitful. And this was to be expected, for the British representatives included some of our best-known practical workers, and they sat beside their distinguished French similars. Considerable space and time was allotted to the transactions of the sections dealing with women and public health, and from the medical point of view the most important debates of the congress centred round the care of women and children. Mrs. Massey Lyon described the various child welfare organisations in Great Britain, and the Vicomte Pelleport-Burete described the organisation for the care of puerperal women which is maintained at Bordeaux. An interesting contribution came from Dr. Catherine Chisholm, the medical inspector of the Manchester High School for Girls, who pointed out that examining bodies which failed to see that they were unduly taxing youthful powers were incurring grave responsibilities. Her general conclusions on the matter of physical education of adolescent girls pointed out that physical training should be corrective and educational as well as recreational, and should be distributed over the curriculum and not be relegated to one particular day. In the same section papers were read which instituted interesting comparisons by Mdlle. St. Luc, of Bordeaux, and by Miss Cummins and Miss Phyllis Lyall, respectively almoners at St. Thomas's Hospital, London, and the Maternity Hospital, Glasgow. Miss Lyall well represented the directions of modern opinion in pointing out the need for appropriate Government intervention in respect of the problems of illegitimacy, and revision of the present law in relation to illegitimacy and adoption. French law is more liberal-minded than British law.

CHARTERED SOCIETY OF MASSAGE AND MEDICAL GYMNASTICS.—Applications are invited for the following bursaries under the scheme for a permanent memorial to the late Miss Lucy Robinson: (1) £20 to a student in training for conjoint examination, massage, and medical gymnastics; (2) £20 to a masseuse who gained the I.S.T.M. certificate in massage, was a member of the I.S.T.M., and is a registered member of the Chartered Society, as assistance towards qualifying further in medical gymnastics or medical electricity. Further particulars may be obtained from the Secretary of the Society, 157, Great Portland-street, W. 1, to whom applications for bursaries must be sent not later than June 30th.

DONATIONS AND BEQUESTS.—The late Mrs. Alice Theresa Lucas left by will £1000 to Guy's Hospital, and £10,000 to that institution in certain contingencies which also applies to £5000 to the National Society for the Blind; £5000 to the Hospital for Consumption and Diseases of the Chest, Brompton; £3000 to the Belgrave Hospital for Children; £3000 to the Chelsea Hospital for Women; £3000 to the Victoria Hospital for Children, Tite-street, Chelsea, S.W., and Broadstairs, Kent; £3000 to the London Hospital; £3000 to the Jews' Deaf and Dumb Home, Nightingale-lane, S.W.; £1000 to the Hospital for Women, Soho-square; £500 to the National Society for the Prevention of Cruelty to Children; £500 to the Cancer Hospital, Brompton; and £500 to Queen Alexandra's Hospital Home for Discharged Soldiers.—By the will of the late Mr. Edwin Heard, of Liverpool, the testator left £200 to the Liverpool Royal Infirmary; £100 to the National Institute for the Blind; and all other his property to the Royal Liverpool Children's Hospital.

MILLER GENERAL HOSPITAL FOR SOUTH LONDON.—A dinner is to be held in connexion with the endeavour which Lord Queenborough, the president of this hospital, is making to raise the sum of £46,000 for the hospital extensions. The institution was founded in 1783 as the Kent Dispensary, and has from that time steadily increased in size and utility, though it is still far too small for the needs of the population to which it ministers. King Edward's Fund for London has approved an extension which will eventually mean the addition of 336 beds. At the present moment the hospital has 100 beds, but this is only made possible by utilising the board room, the matron's office, and other administrative accommodation as a ward—obviously an unsatisfactory arrangement. The immediate proposal is to build one more ward block of three wards, giving 78 beds, a main kitchen, stores, and also the first section of a home for nurses. For these additions £46,000 are required, of which £24,000 only are in hand. A sketch of the proposed ward blocks and of the nurses' home is contained in an informative pamphlet which is being sent out from 39, Berkeley-square, London, W. 1, by Lord Queenborough, to whom applications for dinner tickets should be made.

RESEARCH DEFENCE SOCIETY.—The annual general meeting of this society was held on June 13th, at the house of the Royal Society of Medicine, 1, Wimpole-street, W., Lord Lamington, the President, being in the chair. There was a good attendance of members. A satisfactory report of the work done by the society during the past year was submitted, in which among other things it was pointed out how great was the contrast between the present conditions as regarded the attitude of the public towards research and conditions as they were in 1908, when the society was founded. The treasurer stated in his report that the finances of the society were in a satisfactory condition, and that subscriptions and contributions from branches exceeded those of 1922 by £115 and donations by £22. The reports having been passed unanimously, Dr. Andrew Balfour, Director of the London School of Hygiene and Tropical Medicine, then gave a demonstration of a cinematographic film illustrating the natural history of malaria and the preventive method against that disease. This film had been prepared and was lent by the International Health Board of the Rockefeller Foundation. Dr. Balfour began by emphasising the need of the experimental spirit for the development of medicine, and he quoted Sir William Osler in showing that the whole work which has been done on malaria was based on experiments on animals. Sir Ronald Ross's work in India also depended on experimental work on animals, and Dr. Balfour, in pointing out how essential such work was, said that no man of sense or sensibility would use animals to experiment on if he could possibly avoid it. The film shown was one that had been prepared in America to give a vivid and simple picture of the ravages of malaria, particularly for the benefit of the agricultural population of the Southern States. The life-history of the plasmodium was well depicted, and stress was laid

on the various methods of breaking the chain of infection at one or other of its links, whether by stamping out the mosquito, rendering man immune by quinine, or by guarding him from the bites of the insect by means of netting. At the conclusion of the film Sir Ronald Ross thanked Dr. Balfour, and pointed out that our present knowledge of malaria had existed for a quarter of a century, yet it was only now that an attempt was being made to tackle the problem efficiently throughout the world.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.—An extraordinary meeting will be held at 11, Chandos-street, London, W. 1, on Friday, June 27th, at 8.30 P.M., when the plans for publishing a journal will be laid before the members of the Society.

LANCASHIRE AND CHESHIRE SOCIETY FOR THE PERMANENT CARE OF THE FEEBLE-MINDED.—The annual meeting will be held in the Mayor's Parlour of the Manchester Town Hall on Thursday, June 26th, at 3.30 P.M., the Lady Mayoress presiding.

Parliamentary Intelligence.

HOUSE OF COMMONS.

MONDAY, JUNE 16TH.

Retrenchment in Indian Army Hospitals.

Colonel Sir CHARLES YATE asked the Under Secretary of State for India whether, considering the disastrous effects in Mesopotamia of the retrenchment in hospitals establishment in the army in India carried out in pre-war days, the India Office was prepared to sanction the proposed reduction of 1957 beds in British and 2041 beds in Indian station hospitals, of 15 officers of the Indian Medical Service, and 60 assistant surgeons.—Mr. RICHARDS replied: These reductions have been or are in process of being carried out, with the sanction of the Secretary of State where that was required. They are partly due to reductions of combatant strength, and in any case will not seriously affect the improvements introduced since the experience of Mesopotamia.

Indian Assistant Surgeons.

Mr. HOPE SIMPSON asked the Under Secretary of State for India how many assistant surgeons of the Indian Medical Department were dismissed during the financial year 1923–24, and how many it was proposed to dismiss during the current financial year; whether any representations had been received on this subject; and whether, in view of the very serious unemployment among Anglo-Indians at the present time, the Government of India could take steps to avoid reduction of cadre until some of the unemployed had been able to obtain other work.—Mr. RICHARDS replied: A reduction of 92 assistant surgeons has been sanctioned, including 32 who are in excess of the establishment, but it is not known how many of these were discharged in 1923–24. Certain representations on this and other matters relating to the Anglo-Indian community have been received and transmitted to the Government of India. As in the case of other services, retirements are being carried out on favourable terms, and I fear I cannot hold out hope of any exceptional measures in the case of this department to mitigate the hardship involved in the reductions.

Sale of Patent Medicines.

Mr. WALTER BAKER asked the Minister of Health whether in the interests of the health of the community and as some return for the heavy taxation imposed in the form of medicine duty, he would introduce legislation to enable patent medicines to be sold under licences only issuable after an impartial examination of the merits of the proprietary articles.—Mr. GREENWOOD replied: My right hon friend fears that in the present state of Parliamentary business it would be impracticable to attempt legislation on this subject this session.

TUESDAY, JUNE 17TH.

A National School of Medicine.

Sir BEDDOE REES asked the President of the Board of Education whether the Government had any information concerning the reasons that had led the Council of the University College, Cardiff, to oppose the establishment of an independent national school of medicine, in accordance with the recommendations of the Royal Commission on University Education in Wales.—Mr. MORGAN JONES replied: My right hon. friend has himself no information on this matter, which does not fall within the province of the Board of Education. He has, however, made inquiries and understands that it has been the subject of correspondence between the Privy Council and the promoters of a Supplemental Charter for the University College of South Wales and Monmouthshire. The Privy Council, in letters dated Feb. 1st and March 14th, 1923, regarding the Draft Supplemental Charter submitted to them on behalf of the College, gave their reasons for objecting to the complicated scheme therein proposed for the government of the National School of Medicine, and for holding that the interests of the school would be best served by its establishment as an independent unit within the University, on the lines recommended by the recent Royal Commission. The Privy Council, in reply to an inquiry, were informed on Jan. 24th last that it was hoped that the Council of the University College would at an early date be in a position to submit a report to the Court of Governors of the College on the matter; up to the present time, however, no further communication with regard to it has been received by their lordships from the promoters of the Supplemental Charter.

R.A.M.C. Vacancies.

Lieut.-Colonel ASSHETON POWNALL asked the Secretary of State for War if he would state what action it is intended to take to fill the many hundred vacancies for lieutenants in the Royal Army Medical Corps.—Mr. S. WALSH replied: There has been a reduction in the establishment of R.A.M.C. officers, and the vacancies are not so numerous as his question would imply. The number of vacancies is only about 40 at present, and I hope that a large proportion of these will be filled as the result of next month's entrance examination. Beyond this I can add nothing to my previous replies, in which I indicated that the present shortage was receiving careful consideration.

VOLUNTARY HOSPITALS COMMISSION.

THE Conference of Local Voluntary Hospitals Committees was held on June 18th at the Ministry of Health, Lord Onslow, chairman of the Commission, presiding. The morning session was opened by the Minister of Health, Mr. Wheatley, who expressed the appreciation of the Ministry for the work the local committees had done already for the public welfare. Lord Onslow outlined the present position. The Commission was instituted two years ago to deal with the distribution of half a million pounds sterling from Government to make up the maintenance deficits. This sum had been administered in three distributions, which were completed in March of this year. He stated that the Conference had been called mainly to discuss the inquiry, undertaken by the Commission at the request of Parliament, into the extent of the voluntary hospital accommodation required in England and Wales, and the best means of providing and maintaining it.

A questionnaire had been sent out to the local hospital committees and had brought in a large number of replies. He said that the situation of the hospitals was now very much more favourable than when Lord Cave's Committee furnished their report, and that now few hospitals had beds closed through lack of money. The question of extensions was in a better position to-day; it had not even been contemplated three years ago. Out of a total of 216 hospitals reported upon, there were 99 who communicated the need for extra beds.

Thereafter representatives of the local hospitals committees gave their views on the problems presented in their own special areas, and it was noted that three points in particular received emphasis from many speakers. First there was the question of greater need for recovery and convalescent beds in order to relieve the pressure on the accommodation of the central hospitals; secondly, the question of the Poor-law infirmaries was dealt with, and it was felt that no use could be made of these institutions by the voluntary hospital type of patients until the stigma of the Poor-law had been removed. Thirdly, the question of paying wards was raised. This was held by several to be an asset to the voluntary system, and a suggestion was made as to how far the voluntary hospitals might carry out the work of the public health authorities if paid for such work, particularly with respect to the treatment of surgical tuberculosis. In order to arrive at a definite conclusion as to the actual proportion of beds required for the population, it was urged that a detailed analysis of hospital waiting lists be made, and the advisability was suggested of issuing another questionnaire in order to obtain the views of general practitioners throughout the country on this subject.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Monday, June 23rd.

ODONTOLOGY: at 8 P.M.

Papers:

Mr. Ivan S. Spain and Mr. F. N. Doubleday: Ultra-Violet Radiations, Their Use and Limitations in Dentistry.

Prof. A. Hopewell-Smith (Univ. of Pennsylvania): The Non-innervation of Dentine (illustrated by a series of lantern slides, photomicrographs and sections under microscopes).

N.B.—The sections under microscopes, illustrating Prof. Hopewell-Smith's paper, will be in position by 7.30 P.M.

Tuesday, June 24th.

Hospitality to Visitors from the Dominions.

A special Social Evening to welcome the medical men from overseas now in London will be held at the Society's house on Tuesday, June 24th. The guests will be received by the President, Sir William Hale-White, and Lady Hale-White at 9 P.M.

The Library will be open, and various objects of interest will be shown. Music, light refreshments and smoking.

At 9.45 P.M. a short Address will be given by the President in the Robert Barnes Hall, on The Story of "Say Ninety-nine!"

Thursday, June 26th.

UROLOGY: at 8.30 P.M.

Discussion:

On Polycystic Disease of the Kidney, to be opened by Sir Thomas Horder and Sir Bernard Spilsbury.

Paper:

Dr. Parkes Weber: Lipoid Speckling of the Renal Cortex—the So-called "Myelin Kidney."

Will those desiring to take part in the discussion send in their names to the Hon. Secretary, Mr. Girling Ball, 77, Wimpole-street, W. 1, as soon as possible.

Thursday, Friday, and Saturday, June 26th, 27th, and 28th.

LARYNGOLOGY } Combined Summer Meeting.
OTOLOGY }

Friday and Saturday, June 27th and 28th.

STUDY OF DISEASE IN CHILDREN: Provincial Meeting at Liverpool.

SOCIETY OF SUPERINTENDENTS OF TUBERCULOSIS INSTITUTIONS.

SATURDAY, June 28th.—A special meeting at King George V. Sanatorium, Godalming.

MONDAY.—The ordinary quarterly meeting at 122, Harley-street, London, W.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, June 23rd, to SATURDAY, June 28th.—CHELSEA HOSPITAL. Daily Operations, &c. Mon., 2 P.M., Mr. J. B. Banister: Backward Displacement. Wed., 2 P.M., Mr. John Ellison: Vaginal Discharge. Thurs., 9.30 A.M., Mr. F. L. Provis: Sterility. Fri., 2 P.M., Mr. Comyns Berkeley: Cervical Fibroids.—CHILDREN'S CLINIC. Mon., 2 P.M., Dem. of Cases. 4 P.M., Dr. H. E. Archer: Biochemical Investigation of Gastro-Intestinal Diseases. Wed., 2.15 P.M., at Crossroads Club, 88, Alexandra-road, St. John's Wood, Dem. of Baby Cases. 3.30 P.M., Dr. Bernard Myers: The Nutritional Disturbances of Infancy. Thurs., 10 A.M., At Children's Clinic, Dem. of Cases. 11.30 A.M., Mr. Rocyn Jones: Birth Palsies and their Treatment.—LONDON SCHOOL OF TROPICAL MEDICINE. Tuesday and Thursday at 2 P.M., Demonstrations on Diseases of Tropical Countries.—ROYAL NORTHERN HOSPITAL, in conjunction with the Royal Chest Hospital, City-road. Special Course in Intensive Medicine and Surgery (second and last week, as per syllabus).—ST. PETER'S HOSPITAL FOR STONE. Clinical Work and Special Lectures daily (second week, as per syllabus).

HOSPITAL FOR SICK CHILDREN, Gt. Ormond-street, W.C.

THURSDAY, June 26th.—4 P.M., Dr. Hutchison: Affections of the Liver in Children.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN.

TUESDAY, June 24th.—5 P.M., Dr. Gray: The "Eczemas" of Infants and Children.

THURSDAY.—5 P.M., Dr. Dore: Psoriasis.

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL.

THURSDAY, June 26th.—5 P.M., Mr. Richard Lake: Intra-Cranial Complications of Middle-Ear Diseases. (Geoffrey E. Duveen Lectures in Otology.)

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.

MONDAY, June 23rd.—12 noon., Mr. Simmonds: Demonstration of Fractures. 2 P.M., Dr. Scott Pinchin: Medical Out-patients. 2 P.M., Mr. Addison: Surgical Wards.

TUESDAY.—10 A.M., Mr. Steadman: Dental Dept. 11 A.M., Mr. Endean: Venereal Diseases. 2 P.M., Mr. Sinclair: Surgical Out-patients.

WEDNESDAY.—2 P.M., Dr. Burnford: Medical Wards. 2 P.M., Dr. Pernet: Skin Dept. 2.30 P.M., Mr. Donald Armour: Surgical Wards.

THURSDAY.—11 A.M., Dr. Archer: Chemical Pathology. 12 noon, Dr. Scott Pinchin: Diseases of the Heart. 2 P.M., Mr. Bishop Harman: Eye Dept.

FRIDAY.—11 A.M., Mr. Simson: Gynæcological Demonstration. 12 noon, Surgical Registrar: Surgical Pathology. 2 P.M., Dr. Burrell: Medical Out-patients.

SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.

Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M., to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury, W.C. 1.

POST-GRADUATE COURSE.

MONDAY, June 23rd.—12 noon, Dr. Riddoch. Lecture: Anatomy and Physiology of Nervous System. 2 P.M., Dr. Hinds Howell: Out-patient Clinic. 3.30 P.M., Dr. Birley. Lecture: Tuberculi Combined Degeneration of Spinal Cord.

TUESDAY, June 24th.—12 noon, Dr. Greenfield. Lecture: Cellular Reaction in Nervous System. 2 P.M., Dr. Walshe, Out-patient Clinic. 3.30 P.M., Dr. Grainger Stewart: Clinical Lecture.

THURSDAY, June 26th.—2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Dr. Gordon Holmes. Lecture: Syphilis of Nervous System.

FRIDAY, June 27th.—2 P.M., Dr. Gordon Holmes: Out-patient Clinic. 3.30 P.M., Mr. Sargent. Lecture: Tumours of Ponto-Cerebellar Angle.

Applications should be addressed to the Secretary, Medical School, National Hospital for the Paralysed and Epileptic, Queen-square, London, W.C. 1.

J. G. GREENFIELD, Dean.

UNIVERSITY OF LIVERPOOL POST-GRADUATE LECTURES. (At 3.30 P.M.)

MONDAY, June 23rd.—(At the Children's Hospital.) Mr. Leathart: Clinical Cases.

TUESDAY.—(At the Southern Hospital.) Dr. W. Johnson: Neurasthenia.

THURSDAY.—(At the Stanley Hospital.) Mr. A. Evans: Surgical Condition of the Gall-Bladder.

FRIDAY.—(At the Royal Infirmary.) Mr. Litler Jones: Surgical Cases.

UNIVERSITY OF BRISTOL POST-GRADUATE STUDIES. (Bristol Eye Week, June 23rd to 28th, at the Bristol Eye Hospital.)

MONDAY, June 23rd.—10 A.M., Mr. Godby Gibbs: Spectacles. 2.30 P.M., Mr. Godby Gibbs and Mr. E. R. Chambers: Demonstration of Cases.

TUESDAY.—10 A.M., Mr. E. R. Chambers: Glaucoma. 2.30 P.M., Mr. Richardson Cross and Mr. A. E. Iles: Demonstration of Cases.

WEDNESDAY.—10 A.M., Mr. Cyril Walker: Choroiditis. 2.30 P.M., Mr. Cyril Walker: Demonstration of Cases.

THURSDAY.—10 A.M., Mr. A. E. Iles: Significance of Hæmorrhages of the Fundus Oculi. 2.30 P.M., Mr. Godby Gibbs and Mr. E. R. Chambers: Demonstration of Cases.

FRIDAY.—10 A.M., Mr. Richardson Cross: The Occipital Lobe and the Field of Vision. 2.30 P.M., Mr. Cyril Walker: Demonstration of Cases.

Pathological specimens illustrating each subject will be demonstrated daily by Dr. A. D. Fraser.

Appointments.

ROFFEY, B. W., M.R.C.S. Eng., L.R.C.P. Lond., has been appointed Assistant Surgeon, St. Bartholomew's Hospital, Rochester.

Jessop Hospital for Women, Sheffield: LEATHES, Prof. J. B., F.R.C.P. Lond., F.R.C.S. Eng., F.R.S., Honorary Physiologist; STACEY, J. ERIC, M.D. Lond., F.R.C.S. Edin., Honorary Assistant Surgeon.

Royal Southern Hospital, Liverpool: TAYLOR, H., M.B., B.S. Lond., Hon. Asst. Orthopædic Surgeon; ROBINSON, A. L., M.D. Liverp., F.R.C.S. Eng., Gynæcologist.

St. John's Hospital for Diseases of the Skin, Leicester-square: FRAZER, E. HASLETT, M.A., M.B., B.Ch., GREEN, L. J., M.R.C.S., L.R.C.P. Lond., and MUIR, D. C., M.B., B.S., Clinical Assistants.

Certifying Surgeons under the Factory and Workshop Acts: DYSON, R. J., M.B., Ch.B. Leeds (Pickering); FAIRWEATHER, J. W. C., M.B., Ch.B. Edin. (Fordoun).

Vacancies.

For further information refer to the advertisement columns.

Bahamas.—Bacteriologist and Asst. M.O.H. £600.
Bloomsbury Dispensary, 12, Bloomsbury-street, W.C.—P. 100 guineas.
Bradford City.—M.O. £600.
Brighton, Sussex Maternity and Women's Hospital.—Hon. S.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Res. H.S. £75.
Derbyshire Education Committee.—School M.O. £600.
Dudley Guest Hospital.—H.S. £200.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—H.S. £125.
Exeter, Royal Devon and Exeter Hospital.—Asst. H.S. £150.
General Lying-in Hospital, Lambeth, S.E.—R.M.O. £100.
Gilbert and Ellice Islands Colony.—Sen. M.O. £650.
Hong-Kong Government.—Two M.O.'s. Also Asst. Port Health O. Each £600.
Hull Institution and Infirmary, Anlaby-road.—R.M.O. £500.
Liverpool, Royal Southern Hospital.—Hon. Asst. P. and Hon. Asst. S.
Manchester, St. Mary's Hospitals.—Three H.S.'s Each £50.
National Hospital for the Paralysed and Epileptic, Queen-square, W.C.—Asst. Path. £250. Also R.M.O. £200.
Putney Hospital, Lower Common, Putney, S.W.—Res. M.O. £150.
Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Sen. Res. M.O., Two Asst. Res. M.O.'s. £100 and £80 respectively.
Reading, Royal Berkshire Hospital.—Third H.S. £150.
Rochdale Infirmary.—M.O. in charge of X Ray, &c., Dept.
Royal Chest Hospital, City-road, E.C.—P. in charge of Out-patients.
Royal Ear Hospital, Dean-street, Soho.—Registrar. £50.
St. John's Hospital for Diseases of the Skin, Leicester-square, W.C.—Pathologist. £100.
St. Mary's Hospital for Women and Children, Plaistow, E.—Clin. Asst.
St. Peter's Hospital for Stone, &c., Henrietta-street, Covent Garden, W.C.—Clin. Assts.
St. Thomas's Hospital.—Visiting Anæsth.
University College Hospital, Gower-street, W.C.—Asst. to Venereal Dis. Dept. £250. Also Hon. Anæsth.
University of London.—External Examiners.
West London Hospital, Hammersmith-road, W.—Asst. Anæsth.
Windsor, King Edward VII. Hospital.—Asst. P., Asst. S., Clin. Assts., and Anæsth.
Wolverhampton and Staffordshire Hospital.—Res. Surg. O. £250.
Wrexham Infirmary.—H.S. £150.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointments: Portsoy, Banffshire; Bo'ness, Linlithgowshire; Portsmouth, Hampshire; Handsworth, Yorks, West Riding.

Births, Marriages, and Deaths.

BIRTHS.

ABEL.—On June 7th, at Clifton-hill, N.W., the wife of A. Lawrence Abel, M.S., F.R.C.S., of a son.
HARRIS.—On June 12th, the wife of Noel Gordon Harris, M.R.C.S., L.R.C.P., of a daughter.
LLOYD.—On June 9th, at Kensington Hall-gardens, W., the wife of Vernon E. Lloyd, M.C., M.B., B.S., M.R.C.S., L.R.C.P., of a daughter.
MACLEOD.—On June 7th, at 52, Baxter-gate, Loughborough, Leics, to Dr. and Mrs. Neil MacLeod (née Ruth Hill, M.B., Ch.B.)—a son.
SAVY.—On June 11th, at Sonnhalde, Kingussie, the wife of Felix Savy, M.B., Ch.B., of a son.

MARRIAGES.

COLES—BAGSHAWE.—On June 3rd, at St. John's Church, Bournemouth, Alfred Charles Coles, M.D., D.Sc., F.R.S. Edin., to Frances Edith, third daughter of the late Richard Bagshawe, of Nottingham, and of Mrs. Fenn, Cheveley, Surrey-road, Bournemouth.
GASKILL—GRIFFITH.—On June 13th, at the Streatham Wesleyan Church, Dudley Keverne Gaskill, L.D.S., to Gwyneth Griffith, elder daughter of Mr. and Mrs. Richard Hooson Griffith, Streatham.

DEATHS.

EMMETT.—On June 8th, at "Winton," London-road, Portsmouth, suddenly, Richard Emmett, M.D., J.P., aged 66 years.
FERGUSON.—On June 11th, Robert Bruce Ferguson, M.A., M.D. Camb., D.P.H., &c., age 60.
JOHNSON.—On June 14th, at Shalimar, Sidmouth, Major Valentine Goode Johnson, R.A.M.C.
RAPER.—On May 21st, after an operation, Matthew Henry Raper, M.D. Lond., of Valletta, Godalming, formerly Shoeburyness.
SMITH.—On the 8th inst., at St. Mary's Hospital, London, Matthew Baird Smith, B.Sc., M.B., Ch.B. Edin., of Stroud, Gloucestershire, aged 39.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

COLONIAL HEALTH REPORTS.

FEDERATED MALAY STATES.

FROM a report signed by Mr. W. G. Maxwell, C.M.G., Chief Secretary to the Government, it appears that the census taken on April 24th, 1921, shows that the population of these States (Perak, Selangor, Negri Sembilan, and Pahang) was then 1,324,890, of whom 853,528 were males and 471,362 females. The Chinese population was 494,548, being 61,304 more than in 1911. Practically the whole of this increase was in Chinese females, who now number 351 to 1000 males, as compared with 188 in 1911, and the lessening disparity between the sexes among the Chinese is gratifying as indicating a general tendency towards their permanent settlement in the Federated Malay States. In 1921 the Indian population totalled 305,219, as compared with 58,386 in 1901, the increase being due to the development of the rubber-planting industry. The European population rose from 3284 in 1911 to 5686 in 1921, of whom 93·2 per cent. were of British nationality. The most satisfactory feature of the census is that all the statistics—of sex, of marriage, of age, and of birth-place—show that the immigrant races, who have done so much to develop the resources of the Federated Malay States, are ceasing to look upon these States as a place of temporary sojourn and are tending more and more to make their permanent home here. There were in 1922 34,906 births and 35,028 deaths, the rates being 25·65 and 25·74 per mille respectively. The death-rate is the lowest recorded for 12 years. Deaths of children under 1 year of age numbered 5963, being an infantile mortality rate of 170·83 per mille. As usual, malaria heads the list as the most important cause of sickness and death. The number of deaths recorded was 15,570 (11·44 per mille). The public, though slow to undergo indoor hospital treatment for venereal diseases, is keenly appreciative of the facilities now afforded to outdoor patients. Injections of novarsenobenzol were given to 19,690 persons. Comparatively few cases of gonorrhœa come for treatment. A systematic campaign against yaws makes good progress. In 1922 injections of novarsenobenzol were given to 22,972 persons, as against 12,207 in 1921. In certain districts the disease has been almost eradicated. The Malays travel long distances to obtain treatment. The number of vaccinations was 65,201 as against 68,280 in 1921. It will be noticed that the vaccination-rate far exceeds the birth-rate. As regards infectious diseases, 1 case of plague, 18 of cerebro-spinal meningitis, and 16 of small-pox are all there is to report. There was no case of cholera. At the instance of the Infant Welfare Advisory Board an enactment for the registration of midwives was passed during the year. At the Board's request, also, the Government has made arrangements for the training both of midwives and the ayahs employed on estates. There are in the States the following medical institutions: 4 European hospitals; 40 district hospitals; 3 women's hospitals; 3 leper asylums; 7 jail hospitals; 1 quarantine camp (for immigrants); 4 vagrant or decrepit wards; 1 mental hospital; 14 outdoor dispensaries; and 10 town dispensaries. During the year there were 92,690 indoor patients as against 116,785 in the preceding year. Outdoor patients numbered 433,111 as compared with 329,310 in 1921. The decrease in the number of in-patients is largely due to the new town dispensaries, which are most successful and popular. The Mental Disorders Enactment, 1922 (repealing the Lunacy Enactment) marked a very important step; and much is meant by the fact that mental patients are no longer termed "lunatics." The arrangements for early voluntary treatment, and for temporary or conditional discharge should be most beneficial. On Dec. 31st, 1922, the patients at the only institution in the country (the Central Mental Asylum, Tanjong Rambutan) numbered 838 males and 212 females. It is noteworthy that although the number of malaria patients in the year must be some enormous figure, only 78 admissions to the asylum are attributed to malaria. Alcohol accounted for 64 admissions; and it is strange that there were more alcoholic cases amongst the Chinese than amongst Tamils (37 Chinese and 26 Tamils). It is still more strange that opium accounted for only 2 Chinese admissions. Syphilis accounted for 35 admissions. Investigations into the treatment of malaria by quinine and other alkaloids of cinchona have been continued, and details have been sent to the Cinchona Derivatives and Malaria Committee of the Medical Research Council in London. The campaign against malaria is far from being merely a matter of preventing the breeding of anophelines. Malaria is a human disease, and improved methods of its treatment as such will tend to diminish the chances of its being carried from man to man by the agency of the anopheline.

Interesting and important discoveries were made in respect of meliodosis (pseudo-cholera). Investigations of the protozoa of dysentery were continued, as also were studies of new methods of the diagnosis of syphilis.

BRUNEI.

Mr. L. A. Allen, British resident in Brunei (a native State on the north-west coast of the Island of Borneo), in his report for the year 1922, gives the total population as 21,748. Hitherto no births and deaths have been registered, but an Act for the Registration of Births and Deaths was to come into operation in 1923. A total of 1966 out-patients were treated in Brunei town and the out-stations. The more serious cases (45 in all) were sent to Labuan Hospital; the chief diseases of those admitted were: malaria 14, abscesses 7, venereal diseases 5, and amœbic dysentery 3. Malaria was rather more prevalent in 1922 than in 1921, 282 patients being treated. 87 children were examined for enlargement of the spleen and 16 showed definite enlargement. Ankylostomiasis is undoubtedly present in Brunei to a considerable extent. It is impossible to say how prevalent venereal diseases are as the natives do not come for treatment for gonorrhœa or primary syphilis. There were no cases of dangerous infectious disease in the State during the year. It is interesting to note that the last epidemic of such occurred in 1905-06, when Brunei was decimated by small-pox. Some 3000 vaccinations have been carried out during the past four years. At the beginning of 1922 there was an outbreak of "cholerine" in Brunei town, when many of the children died. The officer in charge reports on this as follows: "On investigating this disease I found that many adults were attacked also by diarrhœa and vomiting and violent cramping pains, but in all such cases a high temperature was present also. Very few adults died, however. The fruit season had just come in, fruit was plentiful, and all the cases I saw had eaten a lot of it." Between March and May there was an epidemic of whooping-cough in Brunei town and in the Temburong district, but the mortality from it was apparently very slight. Dr. T. A. C. Cleverton, Medical Officer, Labuan, was in charge of the department throughout the year, paying routine fortnightly visits from Labuan. His valuable advice and assistance in all health and medical matters connected with the State are much appreciated. The total rainfall in Brunei town for the year was 131·60 inches, which was above the average. The mean maximum shade temperature during the year was 86·99° F. and the mean minimum 73·85°, giving a mean temperature of 80·42°.

KENYA COLONY AND PROTECTORATE.

Kenya may be described as situated astride the equator on the eastern side of the continent of Africa. The precise boundaries were proclaimed in the Order in Council of 1921. The southern boundary runs from the coast in a north-westerly direction, and those portions of the colony which are most suitable for European occupation lie in the highlands, from 1° to 2° south of the equator, and, in the case of the Uasin Gishu plateau, within 1° north. The Protectorate is a strip of territory along the coast line up to the Tana River, ten miles broad. It includes also the station of Kismayu in Jubaland, with a radius of 10 sea miles landward from that town. It is 2200 square miles in extent and forms part of the dominions of the Sultan of Zanzibar, from whom it is leased at a rent of £17,000 a year. Kenya Colony comprises the remainder of the territory—viz., 242,860 square miles. There was happily no outbreak of any epidemics in 1922. Immediate treatment was accorded to sporadic cases of plague, and the rat destruction campaign was efficiently maintained. The general public health has been satisfactory, but there is, naturally enough in a young and growing community, which finds itself at the moment financially embarrassed, ample scope for improvement. The problem of native housing in the towns is acute, but there has been an effort to deal with it. In Nairobi a native location has been laid out under municipal auspices, and at the end of 1922 50 huts were in course of construction. The scheme was to be extended in 1923, and will serve as a model for other towns. Sanitary inspection is performed by officers appointed for the purpose in Nairobi, Kisumu, and Mombasa. The registration of births and deaths is not compulsory save for Europeans, and it is therefore impossible to furnish reliable figures of the birth- and death-rates amongst Asiatics and Africans. Such figures as there are serve to show that in Mombasa the crude death-rate is 16·7 per 1000 and in Nairobi 21 per 1000 of the population. The Nairobi rate is capable of analysis, and reveals crude death-rates for Europeans, Asiatics, and Africans of 12·4, 15·6, and 27·9 per 1000 respectively. Over the whole country the number of European births and deaths was 261 and 89, giving crude birth- and death-rates of 27·04 and 9·04 per 1000. The basis of the calculation of those rates is the 1921 census, and it may be safely assumed that owing to trade depression the number of natives has not increased. The figures of that census were: Europeans, 9651; Indians, 22,882; Goans, 2431; Arabs, 10,102; others, 627; total 45,633. The native population is estimated at two and a half millions. On the coast the year 1922 will live in the memory as the wettest year on record. In Mombasa 41·08 inches of rain were registered in the one month of May. In ordinary years the coast is fairly healthy for the tropics. The heat is a damp heat, and never compares with the fierce heat of India. The long rains fall in the months of April to June, and short rains during October, November, and December. The hot season is from January to March. In the highlands the heat is seldom oppressive. During the rains fires are welcome at night, and the climate generally is temperate, though the heat of the sun compels the wearing of helmets or terai from 8 A.M. to 4.30 P.M.

The Kenya Medical Journal.

We have received a copy of the first printed issue of the *Kenya Medical Journal*, which circulates throughout Kenya Colony, Uganda, Tanganyika, and Zanzibar. The journal has developed from a small beginning in cyclostyle form nearly a year ago, and is now launched with the coöperation of Mr. R. F. Mayer, of the *East African Standard*, Limited. It is intended for the distribution of medical news of local or general interest, and for the discussion of problems appertaining to medical science in all its branches. The first issue contains the report of an address given by Sir Arnold Theiler on recent investigations into plant toxins and deficiency diseases of stock in South Africa, which, in view of its great interest, might well have been more detailed than it is. The papers include an analysis of 14 cases of lobar pneumonia in the prison hospital at Nairobi, a case of obstructed labour treated by Cæsarian section (wrongly spelled), and a preliminary report on a new bismuth preparation for the treatment of yaws, being a suspension of precipitated metallic bismuth in 50 per cent. glucose solution. The journal is to be published monthly at a cost of 2*s.* a number, or 21 shillings 50 cents for the year, posted in Kenya. The editor may be addressed at Box 641, Nairobi.

INADEQUATE FEES FOR ATTENDANCE ON MILITARY PATIENTS.

SHOULD a soldier fall ill when distant more than a mile from an officer of the Army Medical Service, or from a medical officer of the Special Reserve, or from a civilian medical practitioner engaged by the War Office at contract rates, he is entitled to treatment at the hands of a private medical practitioner on the basis of a tariff set out in Army Form O. 1067. Women on the married establishment of their respective corps and children under 14 years of age enjoy the same privilege. For such attendance the private practitioner must state on his bill the nature of the case, the dates of his visits, and whether or not medicine was supplied. We learn from the tariff that the ordinary fee for a day-visit (including medicine) is 3*s.* 3*d.*, for a night-visit (including medicine) between 10 P.M. and 7 A.M., 4*s.* 6*d.*, distance being charged extra at the approximate rate of 1*s.* a mile in the day and 2*s.* a mile in the night. The fee chargeable for the visit of the military patient to the surgery of the private medical practitioner is 2*s.* The practitioner who sends us details of a case which he attended upon these terms remarks that the fees seem inadequate, and in this we agree, while we note red-ink alterations on the Army form indicating that the prices have been raised by 30 per cent. since this form was printed in 1915. Our correspondent has, no doubt, protested in writing against the inadequacy of the fees, and his protest, reinforced by those of other practitioners similarly situated, should result in further improvement.

A MORE EXCELLENT WAY.

A LITTLE volume has recently been published as a memorial to its author, a young medical woman, a member of the Society of Friends, who rendered great though unobtrusive services in connexion with various forms of relief work during the war. The play which gives its title to the volume[1] is described as a "Peace Drama of the Balkan War," and affords conclusive evidence of the thoroughness with which Dr. Thomas had thought out her peace position before the catastrophe of 1914. The book is frankly didactic, but to say this is not to disparage it. It contains passages of real beauty, although—as far at least as the prose sections of the play are concerned—it would have been much improved by a revision of the punctuation. A number of short poems, mainly pacificist and all with a strong religious tendency, conclude a book which is evidently the expression of an unusually attractive personality.

[1] A More Excellent Way. By Henrietta M. Thomas, M.D. Baltimore: Williams and Wilkins Company. 1923. Pp. 129. 5*s.*